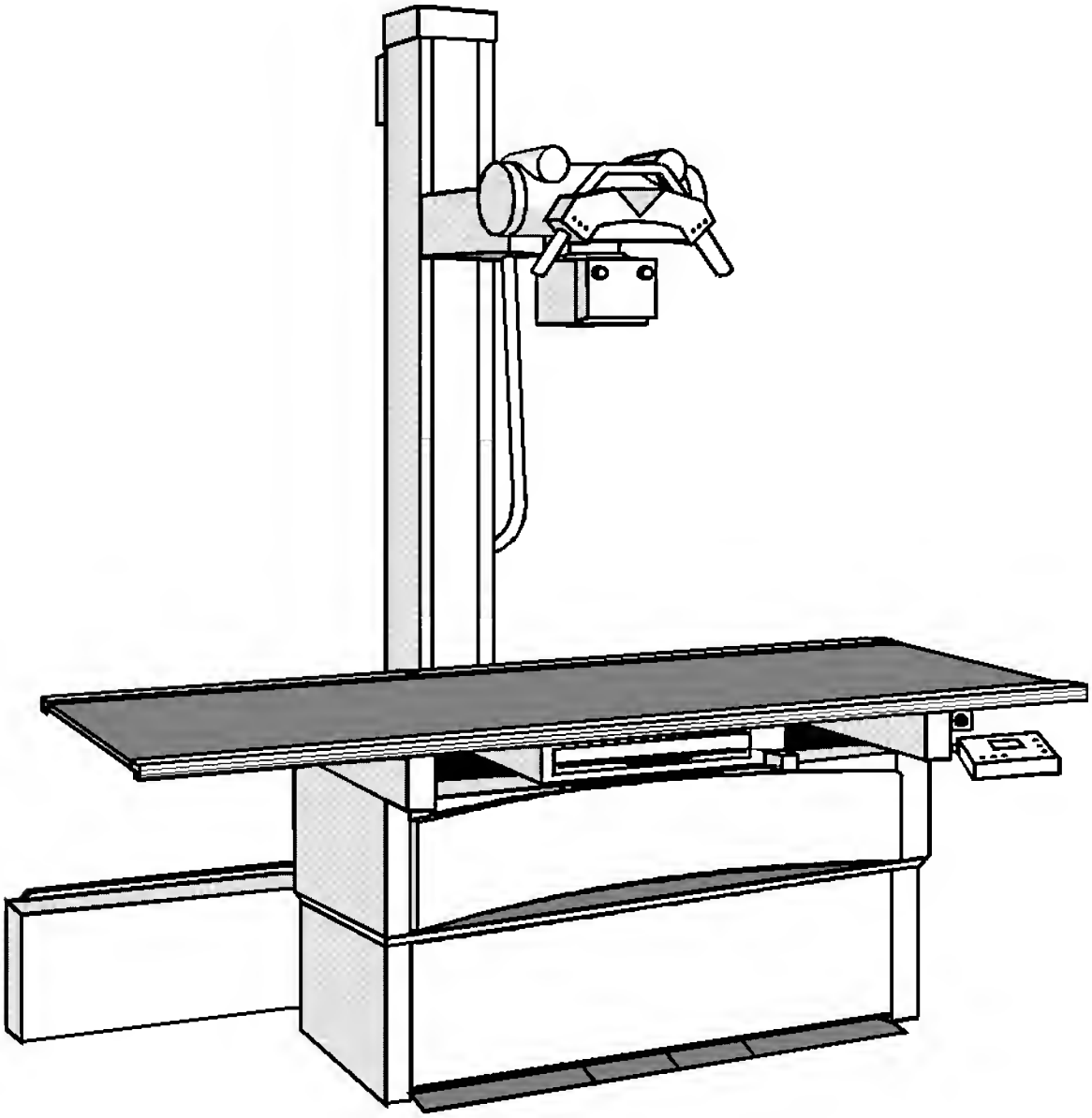
Mounting Instructions COMBI ELEVATOR TOMO-2



CE 0125

English Edition

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TABLE OF CONTENTS *Page*

1. Specification

1.1 General safety notes 4
1.2 Compatibility 4
1.3 Climatic conditions 4
1.4 Dimensions and weights 4
1.5 Component Designation 5
1.6 Dimensional Drawings 6
1.7 Dimensional Drawings/Floor Mounting 8
1.8 Installation of high tension cables 8
1.9 Constructional preparations 7
1.10 Measuring device 8
1.11 Special tools 8
1.12 Power supply data 8
1.13 Schematics 9
1.14 Component Numbers and Designation 24

2. Mounting of Unit

2.1 Preparation of fastening 29
2.2 Unpack equipment parts 31
2.3 Mounting of the table and rail stand 31
2.4 Mounting of column stand 32
2.5 Mounting of Bucky 33
2.6 Mounting of table top 34
2.6.1 Mounting of table top in small rooms 35
2.7 Mounting of X-ray tube and collimator 35
2.8 Mounting of X-ray supporting arm 37
2.9 Mounting of X-ray tube to X-ray supporting arm 37
2.10 Mounting of control arm 38
2.11 Mounting and connection of cable 39
2.12 Counterbalance of column 39
2.13 Mounting of column drive motor 40
2.14 Installation of Tomo 41
2.15 Function description 43
2.16 Mounting of covers 43
2.17 Assembly of rail stand 43
2.18 Assembly of control panel for right hand version 44

3. Adjustment

3.1 Adjustment of the column vertical 45
3.2 Adjustment of the column turning direction 46
3.3 Adjustment of the rotation axis respectively the supporting Arm 46
3.4 Adjustment of rotation catch 46
3.5 Adjustment of the Bucky in table transverse movement 46
3.6 Adjustment of vertical SID switch 47

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3.7 Exposure height 47
3.8 Table height control electronics 48
3.9 Adjustment of Tomo parameters 49
3.10 Centering of Bucky in transverse direction 50
3.11 Adjustment of the basic set-up, zero points and software end switch 50
3.12 Error advise 51

4. Technical Maintenance

4.1 Mechanical and Electrical Tests 58
4.2 Functions Tests 67
4.3 Spare Parts 69
4.4 Spare Parts List 74
4.5 Maintenance Documentation 80
4.6 Maintenance Certificate 81

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1. Technical data

1.1 General safety notes

The electrical installation shall conform to all mandated laws and regulations.
Check the installation layout plan.
During the installation it is important to check that all protective ground wire connections provided by the manufacturer are properly made before the equipment is started up.
The protective ground wires between the individual system components and the power supply shall to be connected as shown in the wiring diagram.
Regulation of professional associations concerning safety and accident prevention shall be observed. No work may be performed on parts carrying a voltage higher than 42 V. If it is necessary to turn on the power for execution of movements of the equipment in the course of installation procedure, it must be shut down immediately after completion of these movements.

1.2 Compatibility

This mounting instruction is valid for COMBI ELEVATOR TOMO-2 all versions.
The table accommodates all standard dimensions in trade Bucky systems.
A Bucky Wall stand can be installed on the right or left side of the table depending on the user side.

1.3 Climatic conditions

During regular work:

Temperature:	10° C to 40° C
Humidity:	20% to 80%
Air pressure:	700 hPA to 1100 hPa

During transport:

Temperature:	-25° C to 70° C
Humidity:	5% to 95%
Air pressure:	600 hPA to 100 h PA

1.4 Dimensions and weights

of components	Dimensions of components	Weights
Table	1400x770x750 mm	245 kg
Table top	2200x810x 40 mm	35 kg
Column	2320x470x302 mm	172 kg
Rail stand	2250x183x302 mm	80 kg
Tube stand with vertical carriage	600x500x200 mm	32 kg
of packing case	**Dimensions of cases**	**Weights**
Table	1530x860x810 mm	280 kg
Table top	2320x930x200 mm	56 kg
Column		
Rail stand	2400x780x760 mm	410 kg
Tube stand with vertical carriage		

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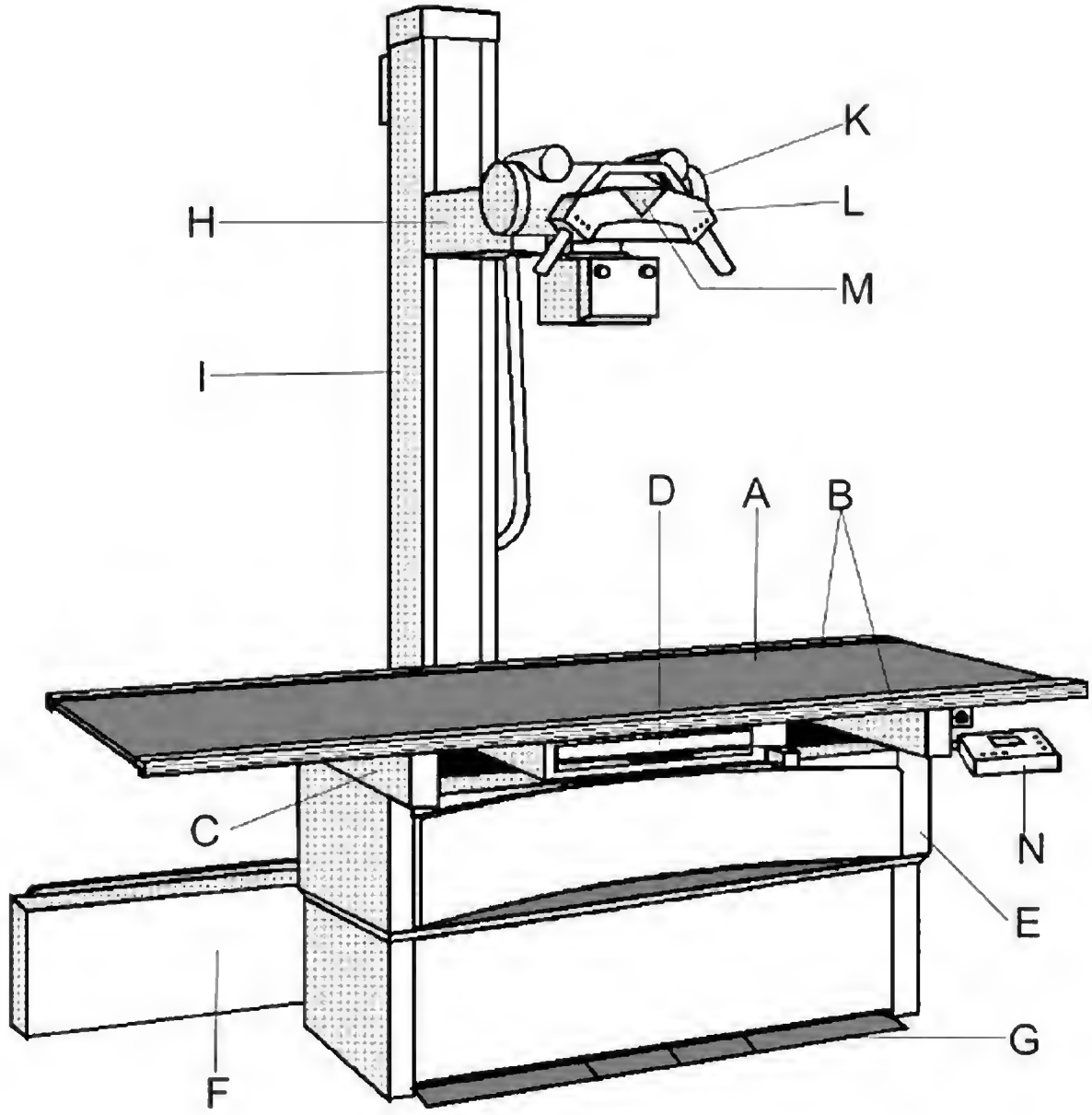
1.5 Component Designation



A Table top, floating, manually movable, scratch reistan
B Accessory rail with trim cover, accepts accessories
C Upper table frame
D Bucky unit, movable
E Table base, solid, vibration-free
F Guide rails for tube stand
G Foot treadle
H Vertical carriage with X-ray tube support arm
I Tube stand, rotatable
K X-ray tube
L Control arm
M Protractor
N Tomo control panel

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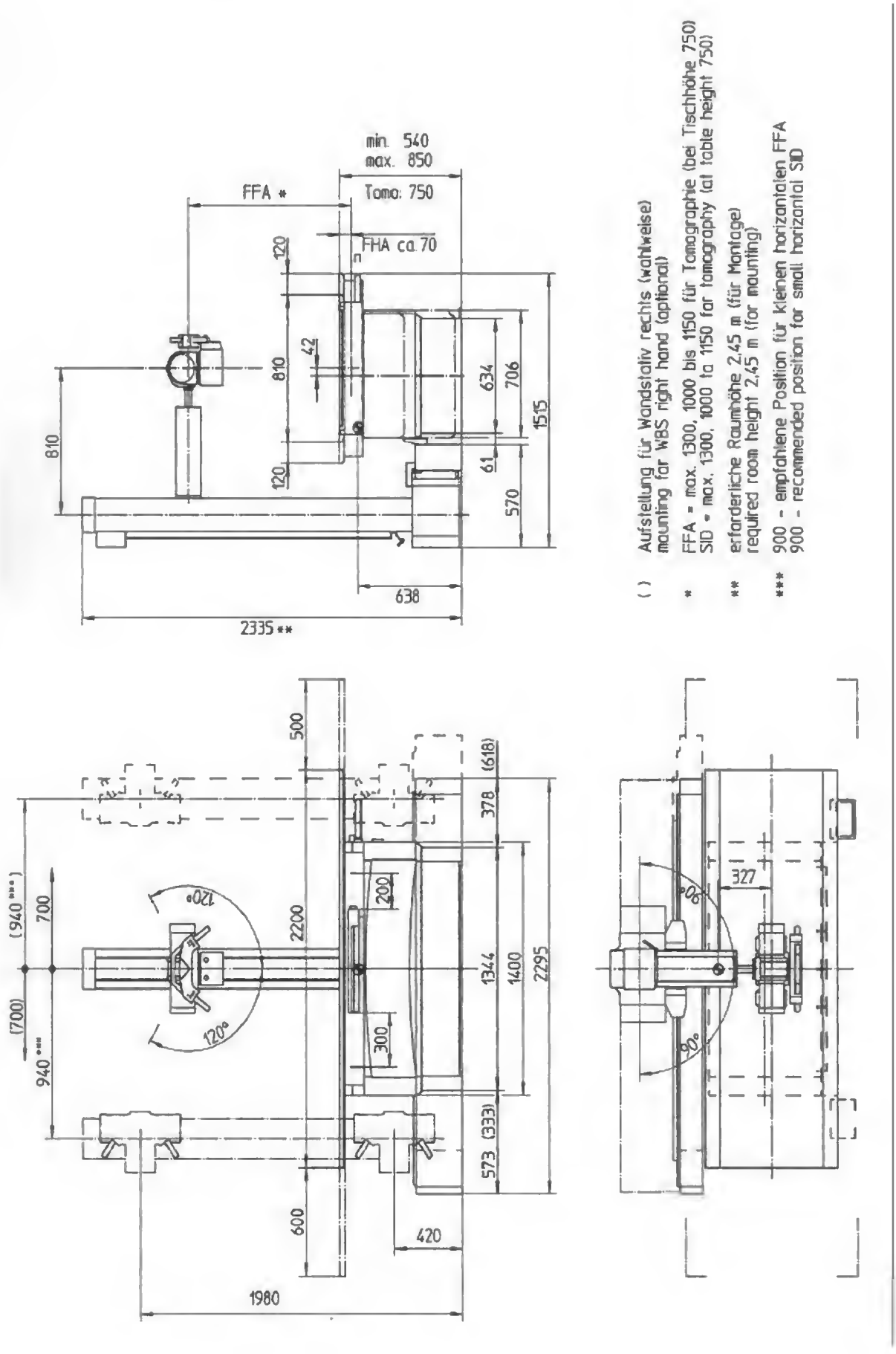
1.6 Dimensional Drawings



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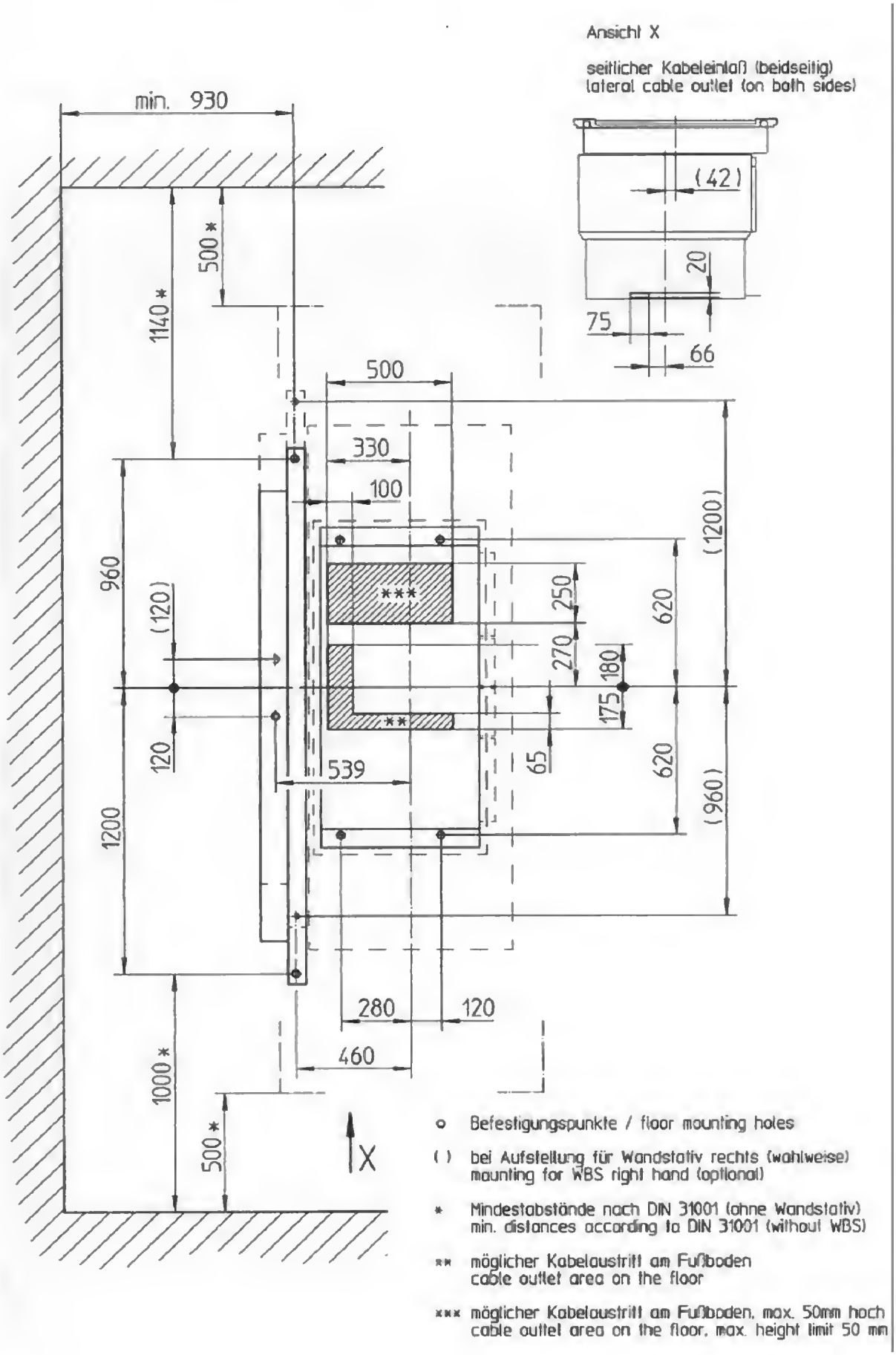
1.7 Dimensional Drawings/Floor Mounting



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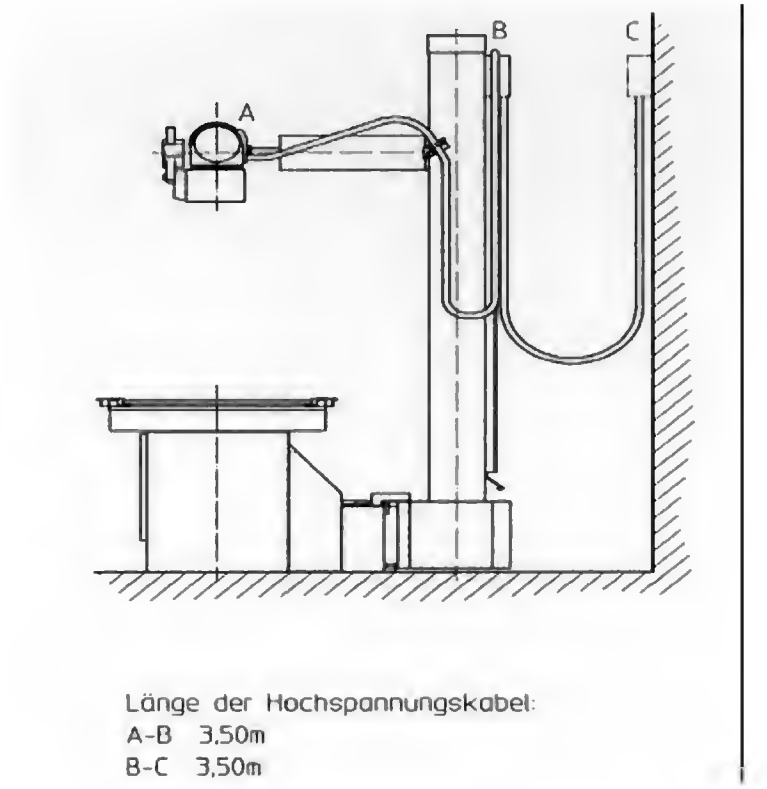
1.8 Installation of high tension cables



1.9 Constructional preparations

The electrical connection data have to correspond with the of the equipment supply voltage. For the COMBI ELEVATOR TOMO-2 supply voltage is 115/230 V with a corresponding ground connection transmission. The mounting points of the COMBI ELEVATOR TOMO-2 have to support a tractive power of 2500 N at each mounting point (concrete floor B 150 DIN 1045 when using the included fastening material).
Prepare on the floor fastening bore-holes of 12 mm according to drawing 1.6., under consideration of the construction.
The connection cable of the COMBI ELEVATOR TOMO-2, the Bucky and the detector has to be placed constructional depending on the version until the terminal box in the table base or until the Bucky according to the installation plan.
The optional ceiling- wall- terminal box can be mounted if required to the wall or ceiling.

1.10 Necessary measuring means

Machine air level

1.11 Necessary special tools

Hammer drill
massonarny drill bit 12 mm
Socket head cap key 4 mm shortened (is included)

1.12 Power supply data

Power supply:	230 VAC	or	115 VAC
Frequency:	50 / 60 Hz		50 / 60 Hz
Rated current:	6 A		12 A
Rated power supply voltage:	1380 VA		1380 VA

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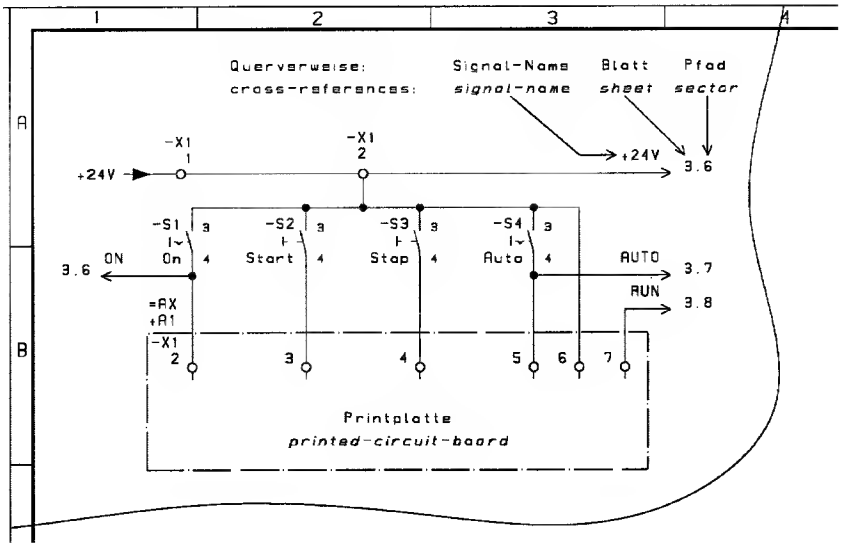
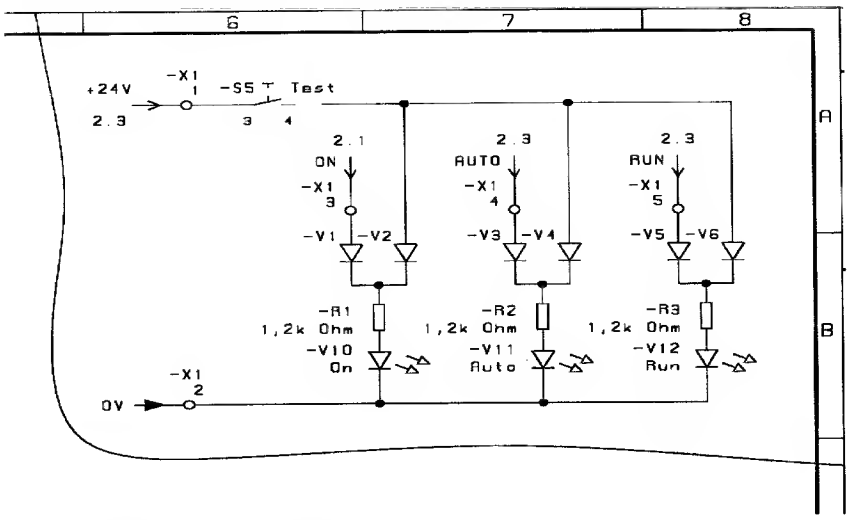
1.13 Schematics sheet 1
1.13.1 Description at Schematics

..... Schematics sheet 2
= AX control panel
= Unit, Indication



..... Schematics sheet 3
= AX control panel
= Unit, Indication



1.13.1 Table of contents at Schematics

Sheet 2	Schematics	=AF	Main transformer
Sheet 3	Schematics	=AF	Elevator 2
Sheet 4	Schematics	=AB	Column
Sheet 5	Block diagram	=AC	Tomo
Sheet 6	Schematics	=AC	Power supply Tomo
Sheet 7	Schematics	=AC	Column drive
Sheet 8	Schematics	=AC	Tube drive
Sheet 9	Schematics	=AC	Bucky drive
Sheet 10	Schematics	=AC	Interface & Handcontrol
Sheet 11	Wiring diagram	=AF	Elevator 2
Sheet 12	Wiring diagram	=AB	Column, Tomo, Tube
Sheet 13	Wiring diagram	=AC	Tomo interface
Sheet 14	Wiring diagram	=AC	Column, Tomo
Sheet 15	Wiring diagram	=AC	Tomo, Bucky, Handcontrol

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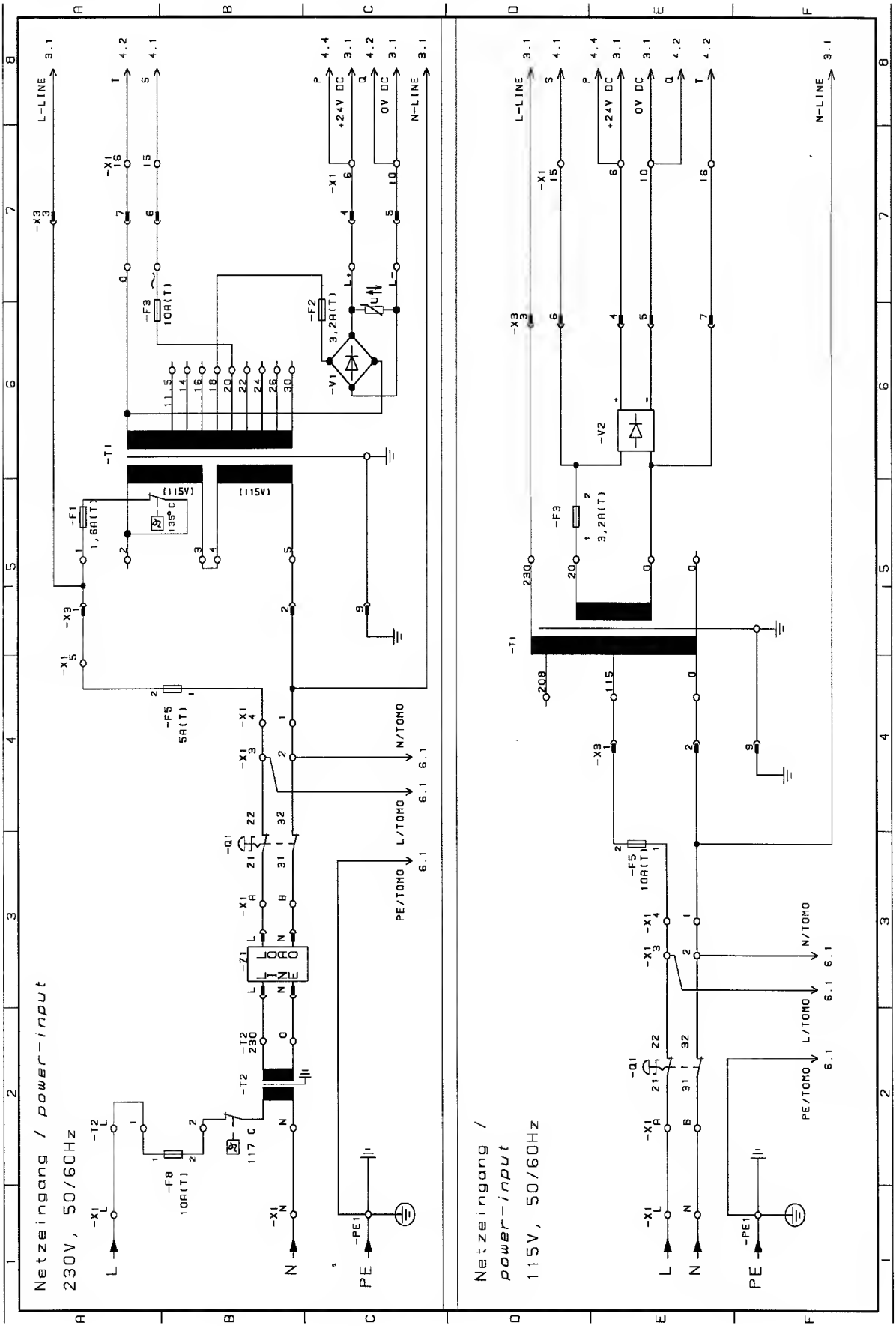
1.13 Schematics page 2 =AF Main transformer



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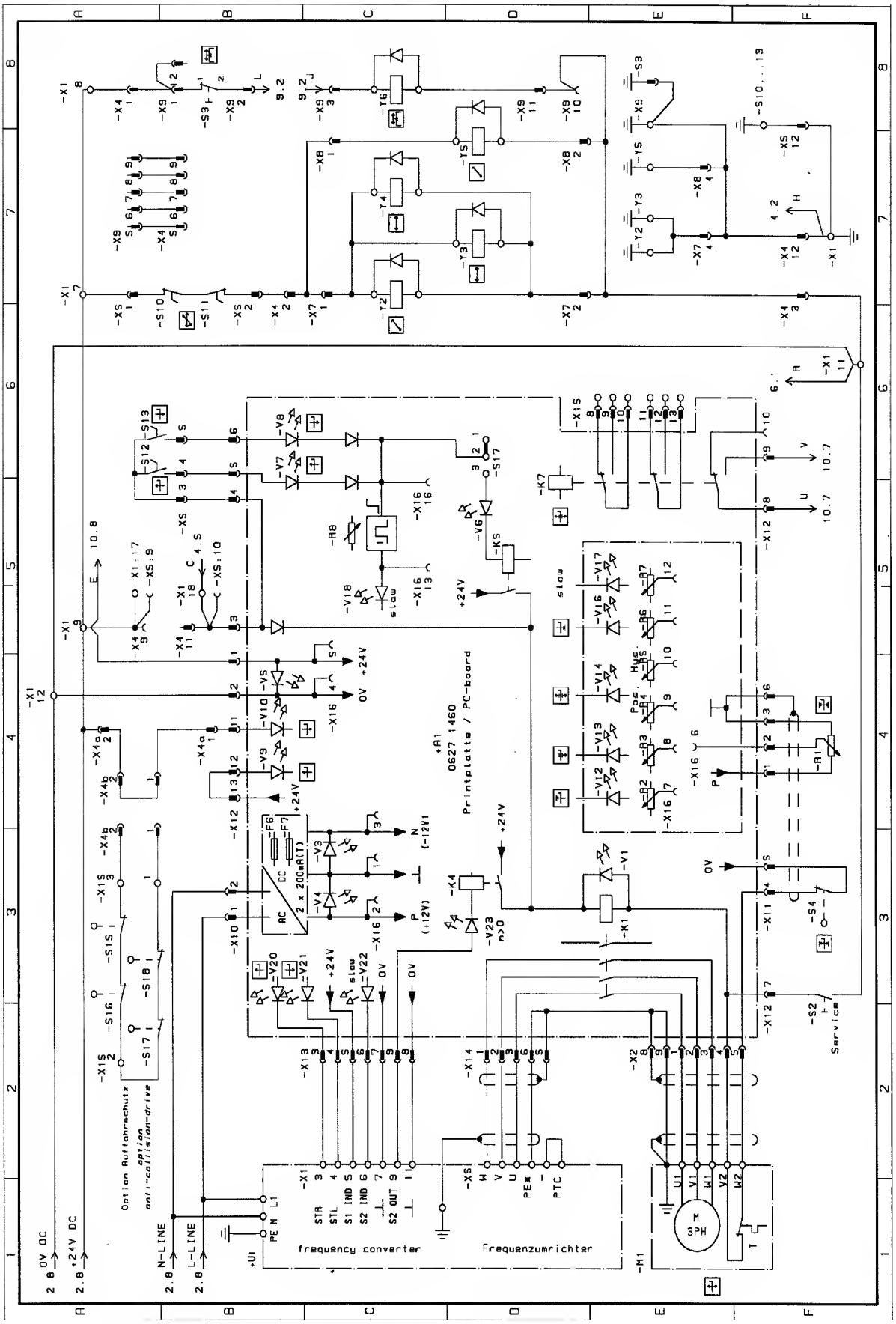

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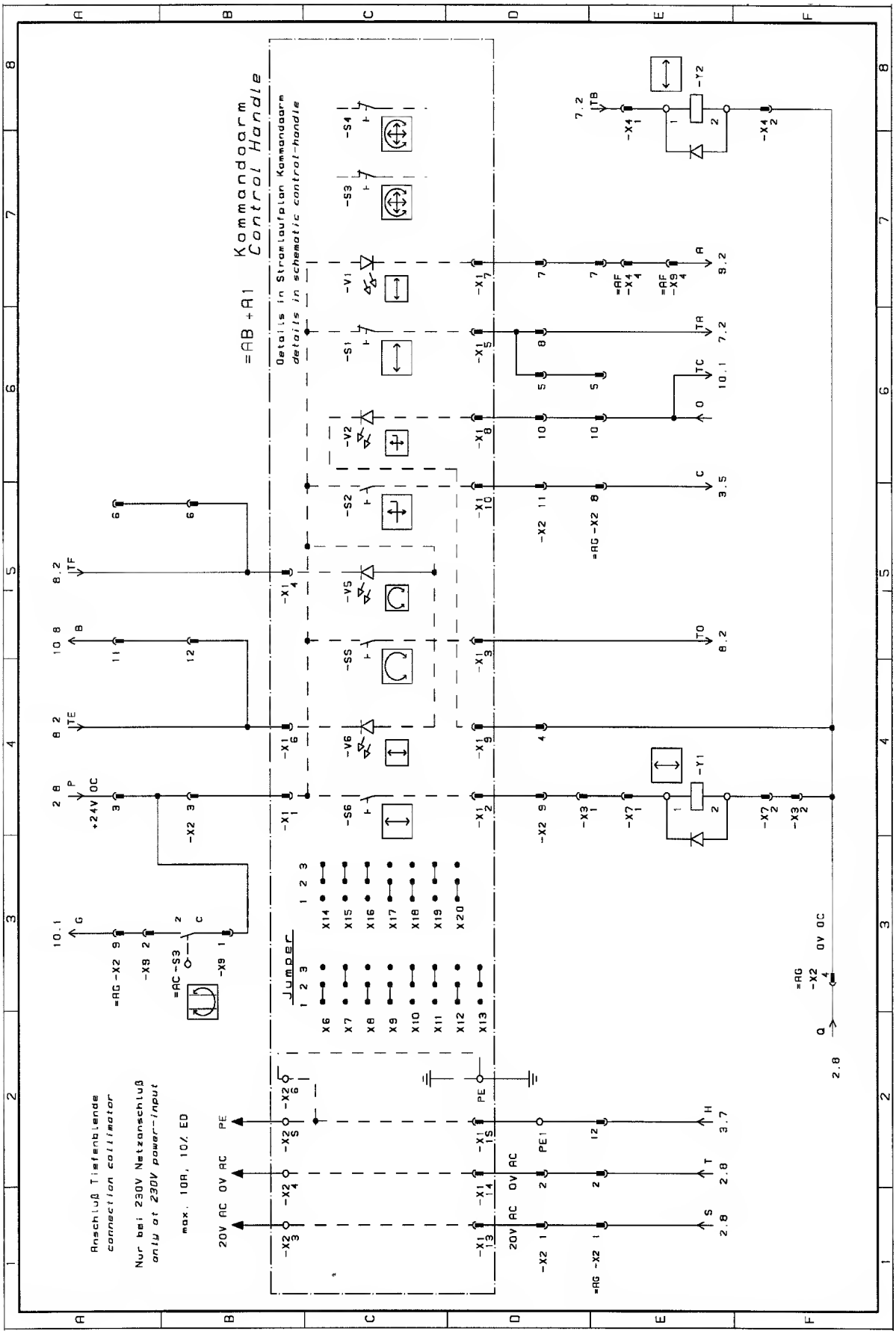
1.13 Schematics page 4 =AB Column



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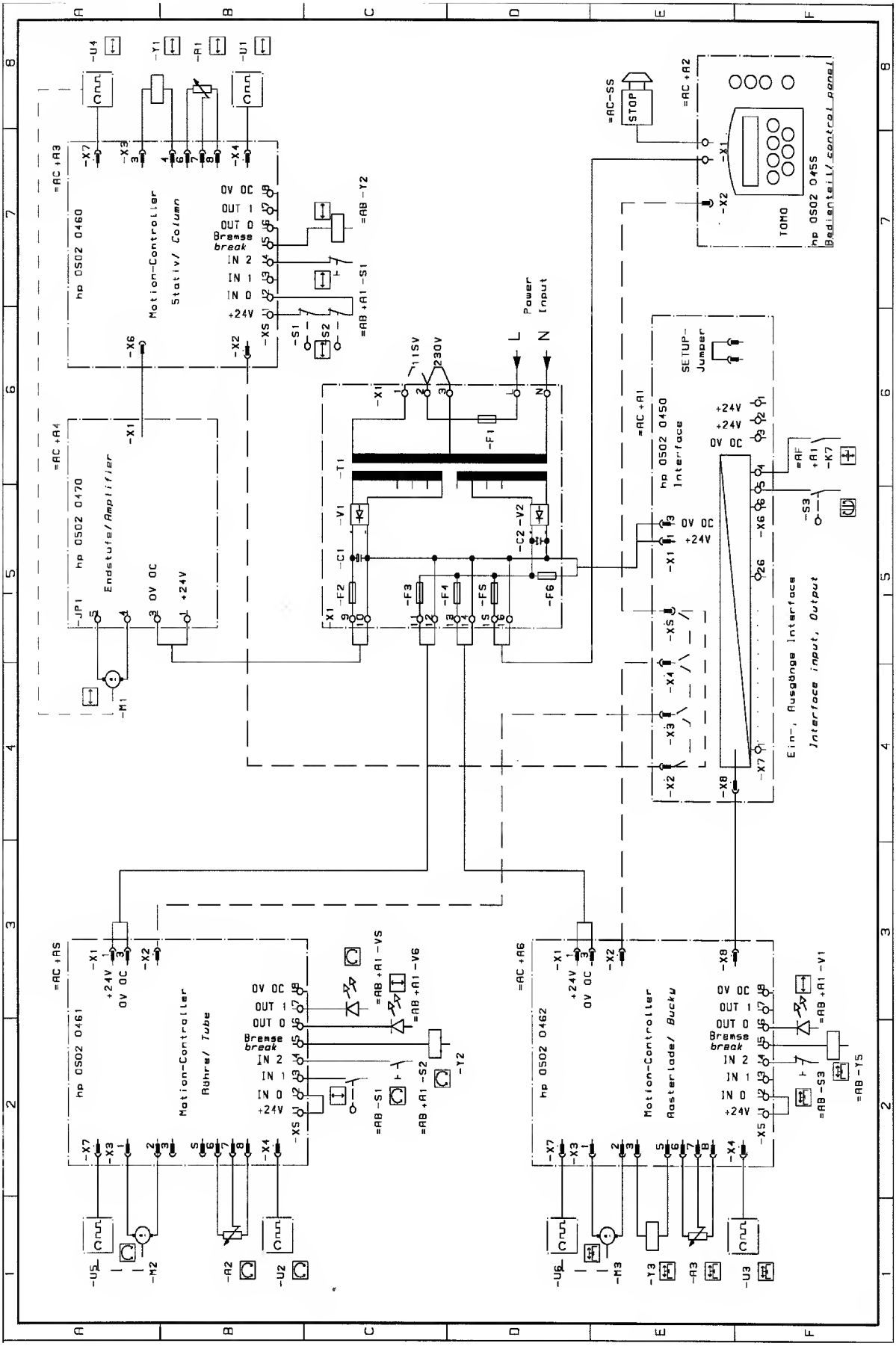
1.13 Schematics page 5 =AC Tomo



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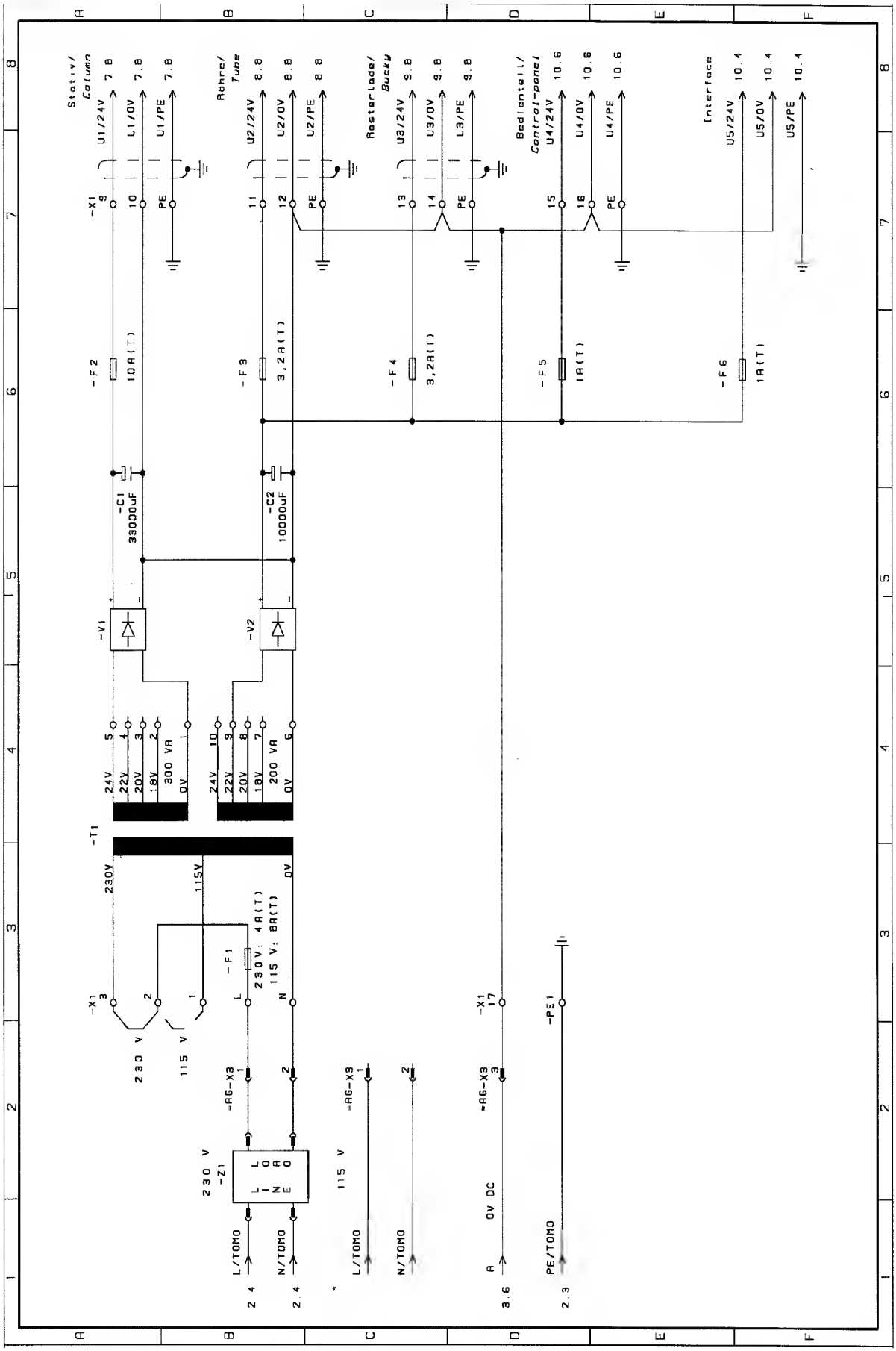
1.13 Schematics page 6 =AC Power supply Tomo



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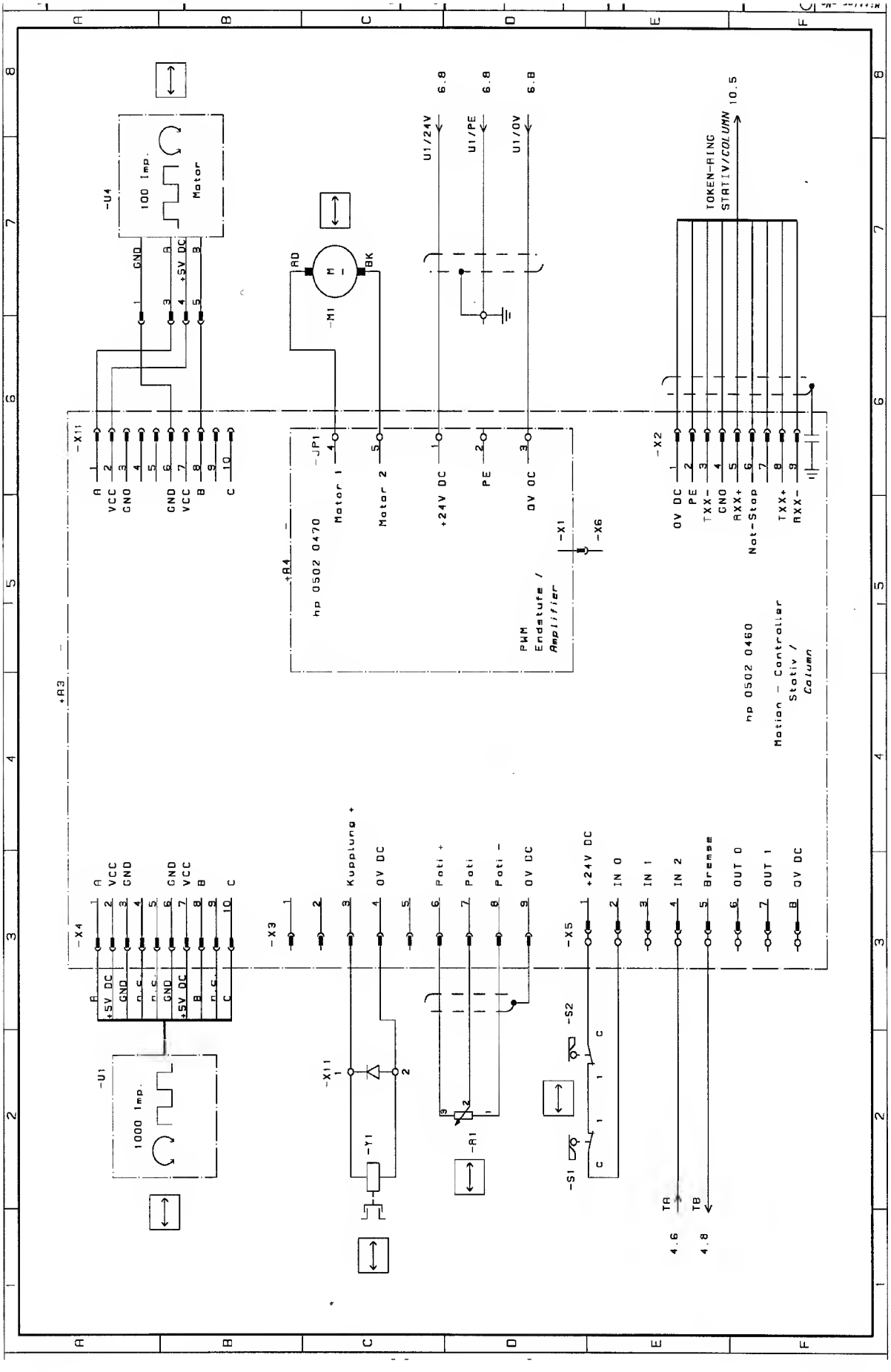
1.13 Schematics page 7 =AC Column drive



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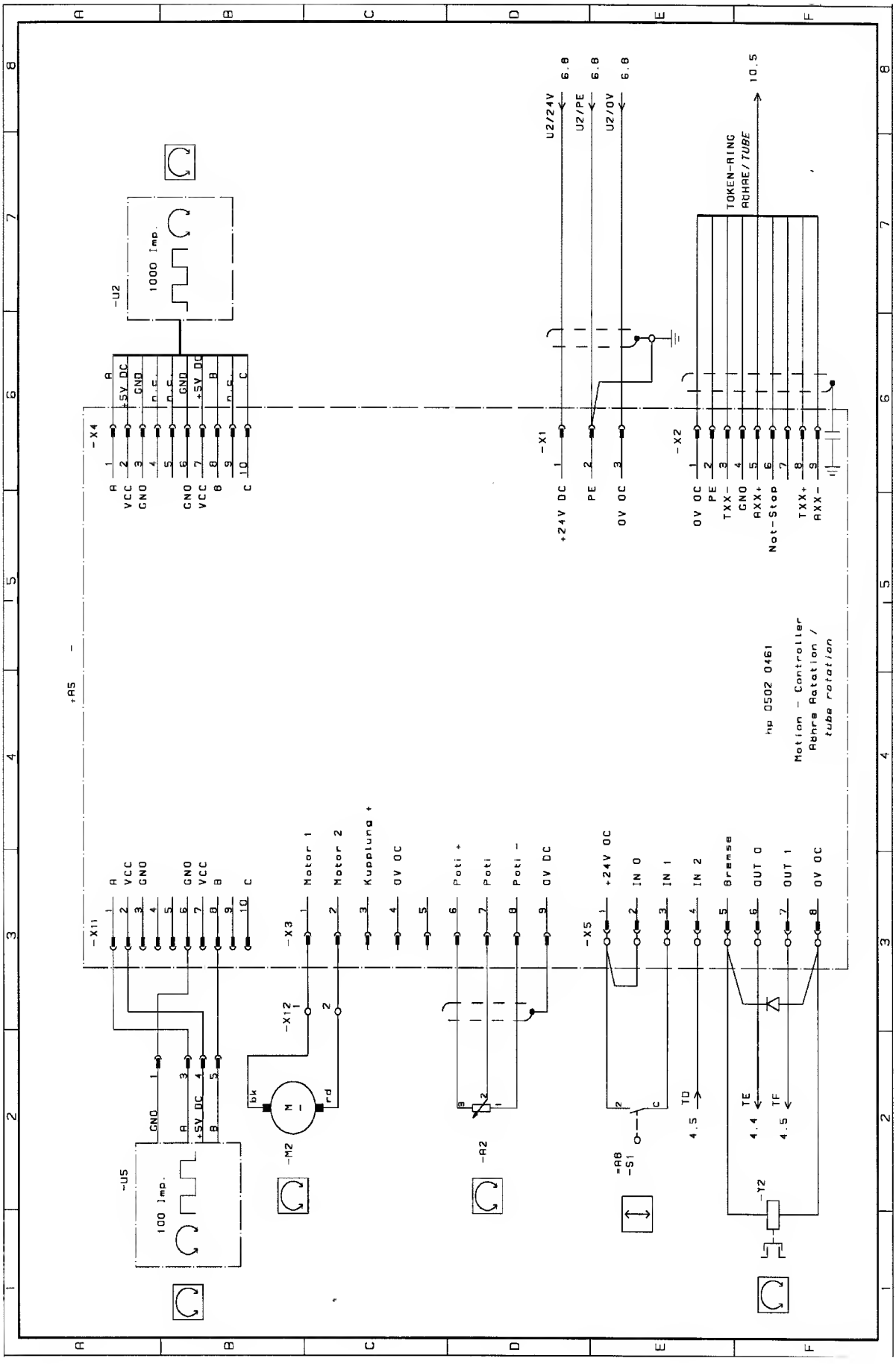
1.13 Schematics page 8 =AC Tube drive



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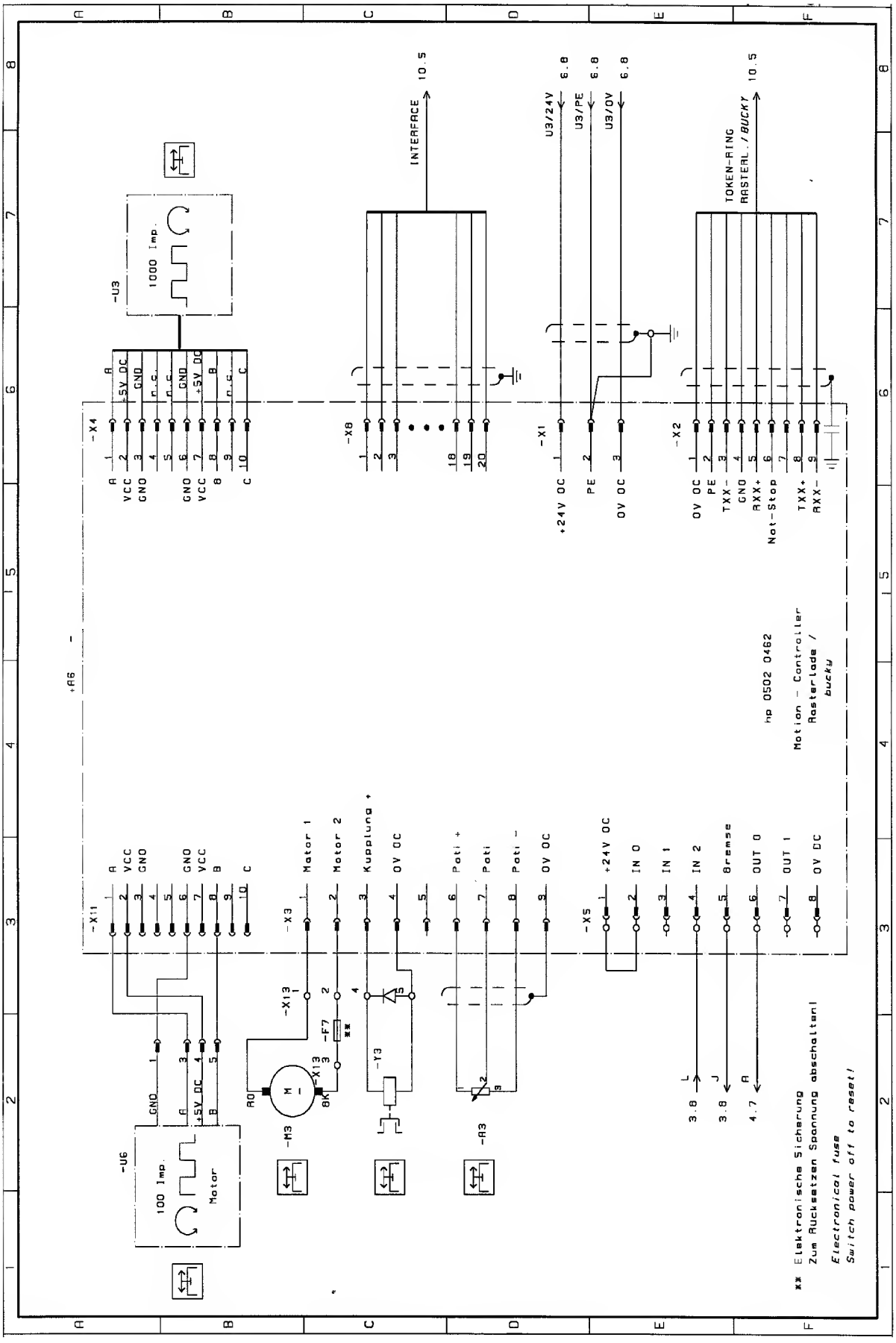
1.13 Schematics page 9 =AC Bucky drive



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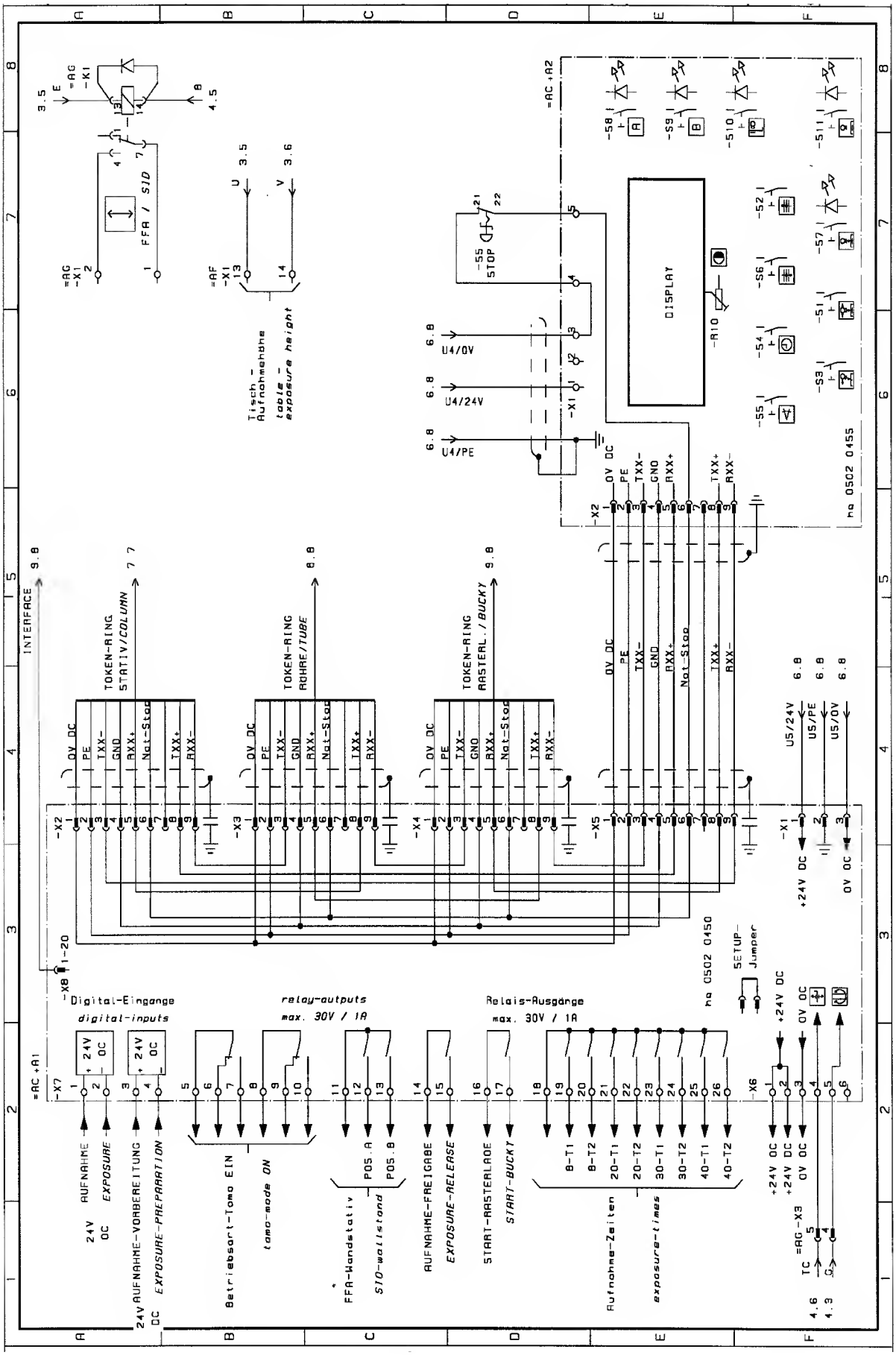
1.13 Schematics page 10 =AC Interface & Handcontrol



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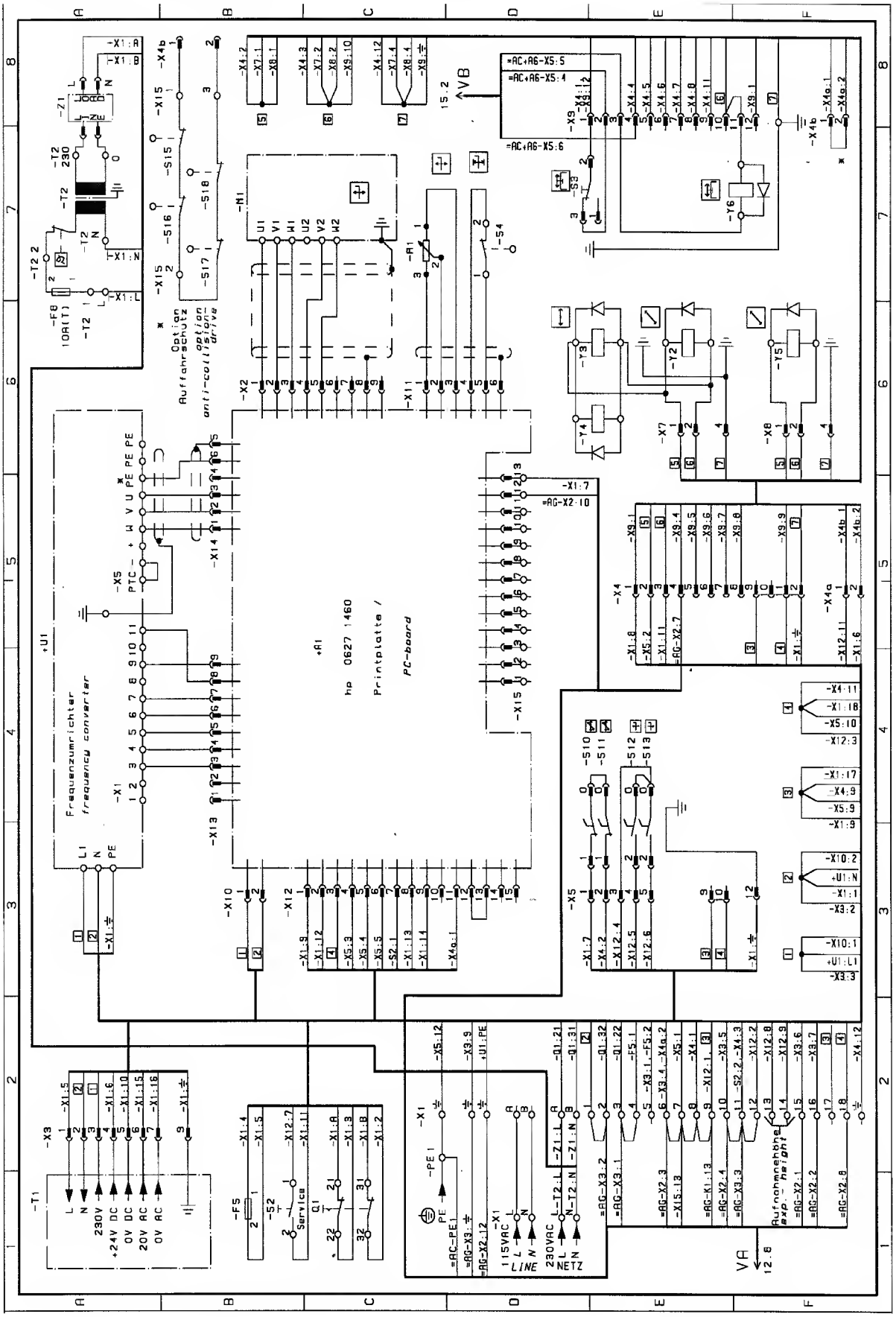
1.13 Wiring Diagram page 11 =AF Elevator 2



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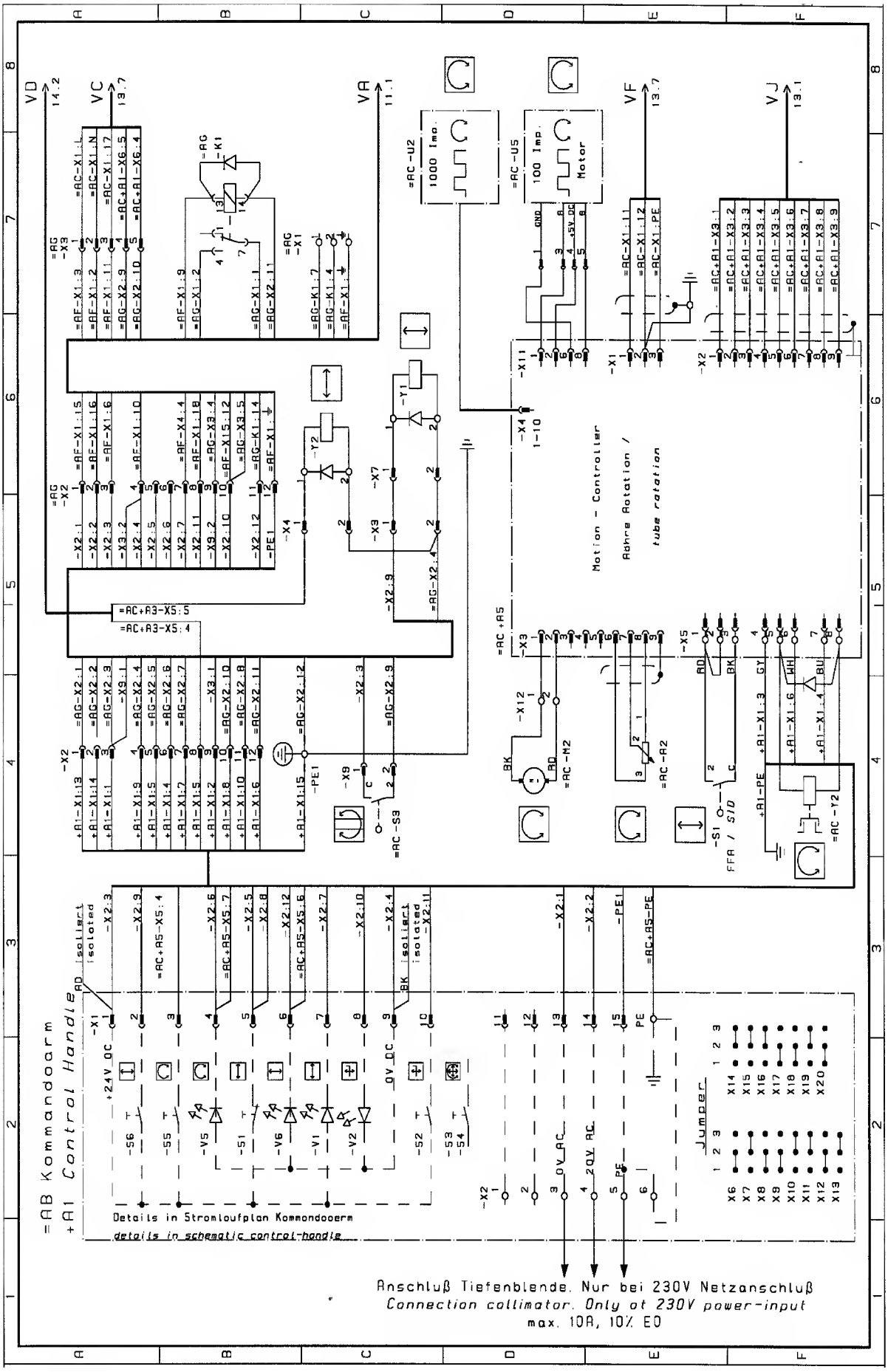
1.13 Wiring Diagram page 12 =AB Column, Tomo, Tube



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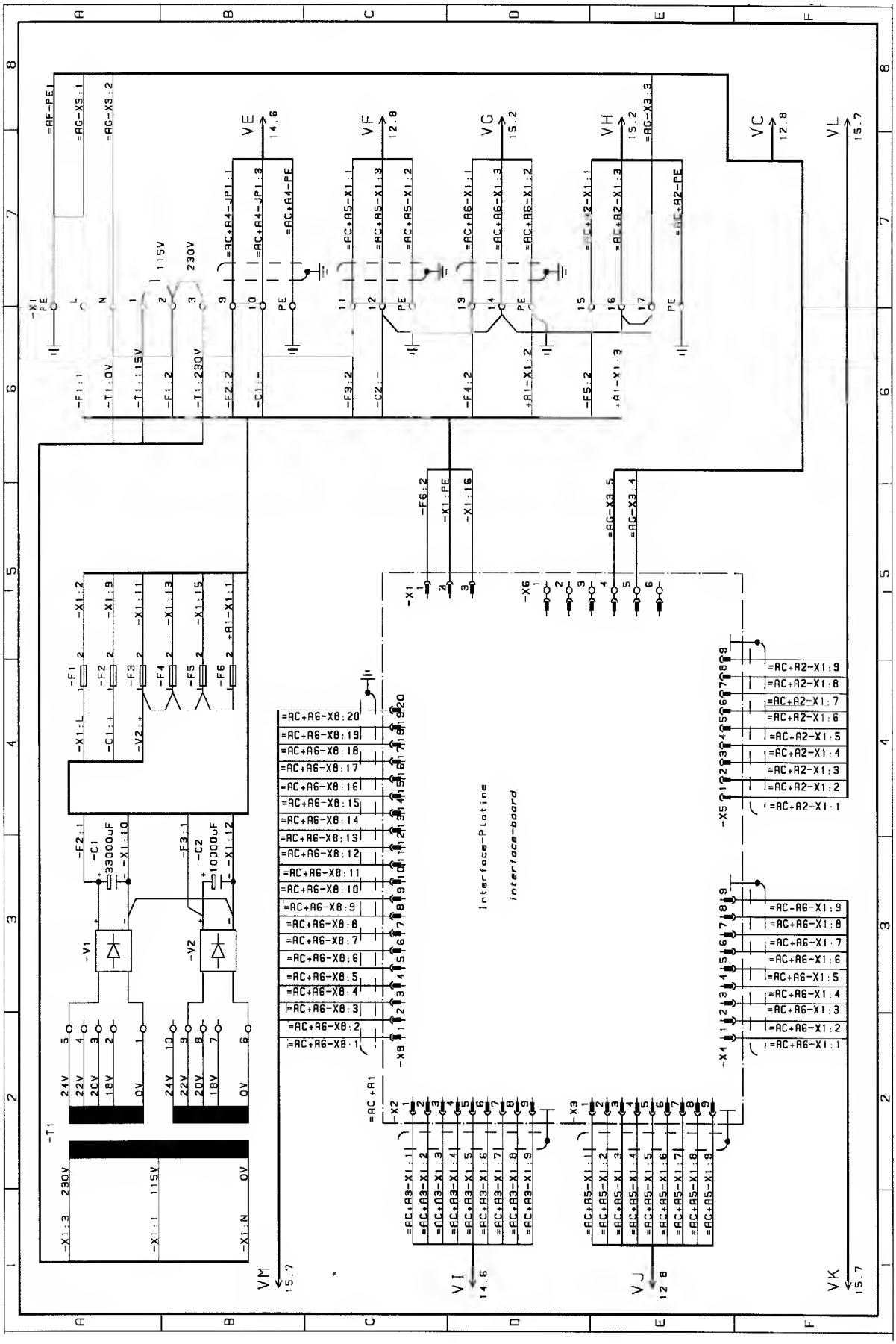
1.13 Wiring Diagram page 13 =AC Tomo interface



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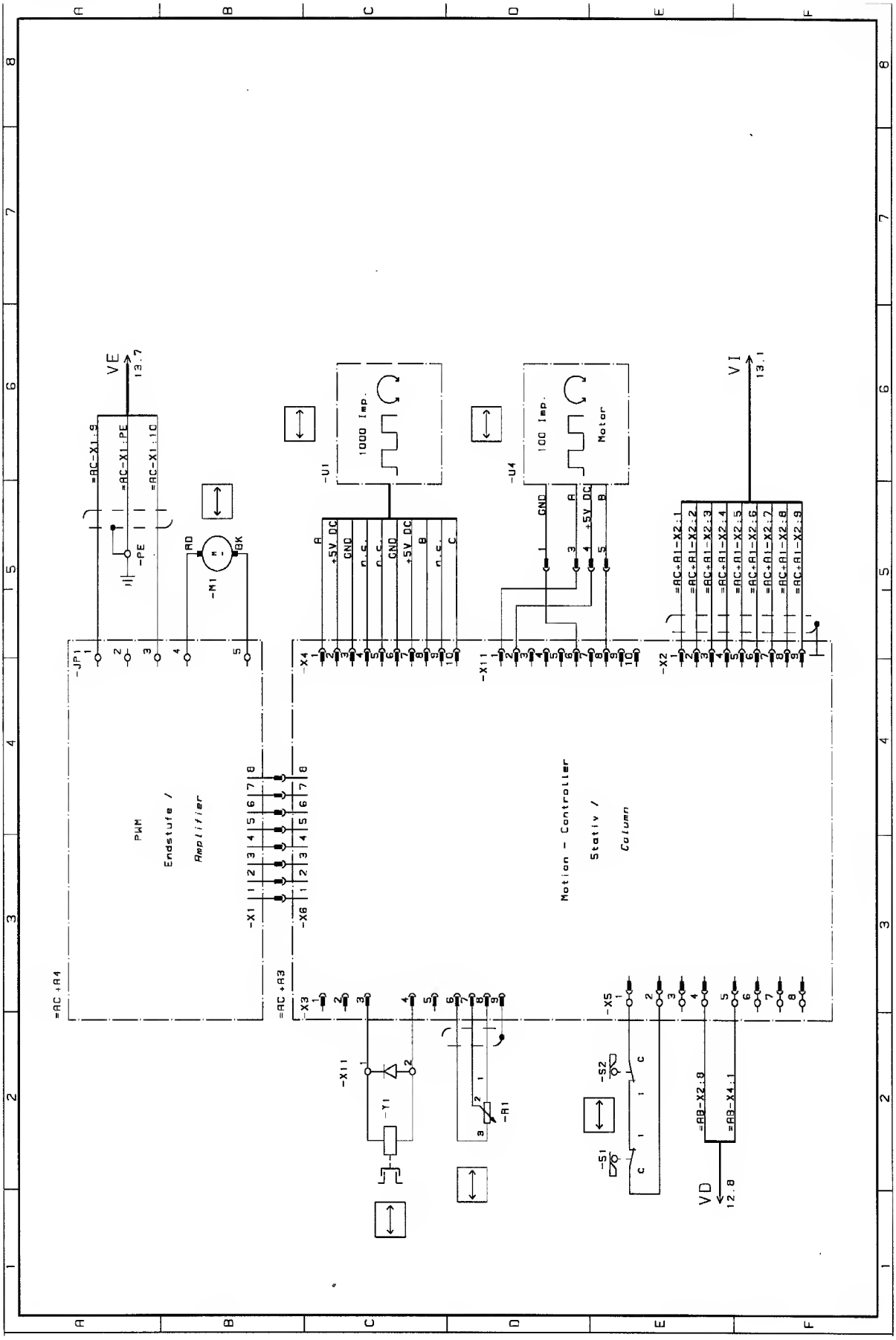
1.13 Wiring Diagram page 14 =AC Column, Tomo



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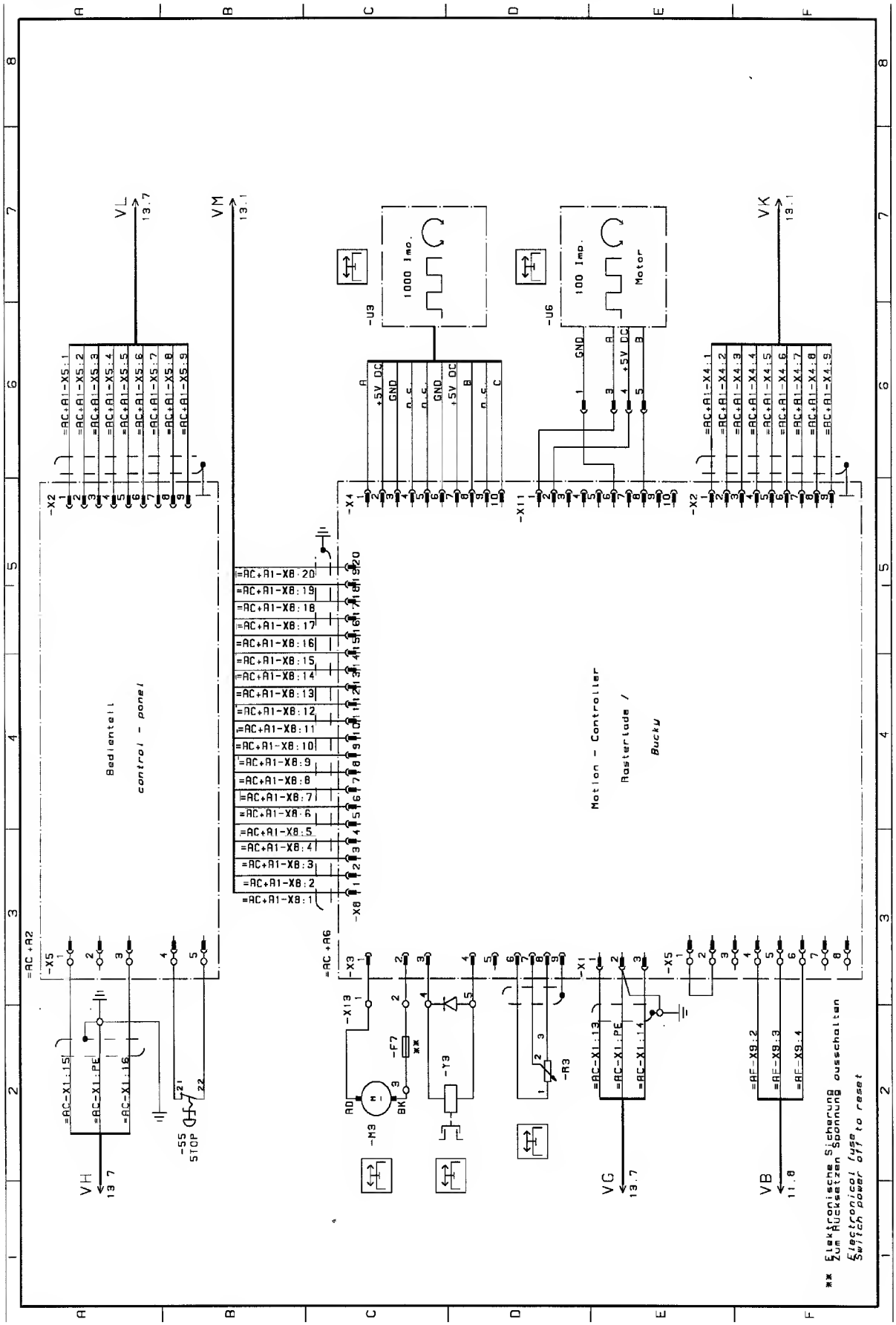
1.13 Wiring Diagram page 15 =AC Tomo, Bucky, Handcontrol



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1.14 Description of components for circuit diagram page 1

=AB-	**Stand**
=AB+A1	**Control Arm**
=AB+A1-X1	Plug-in connection control arm
=AB+A1-X2	Terminal strip for collimator
=AB+A1-X3	Terminal strip for option
=AB+A1-S1	Switch for horizontal brake release
=AB+A1-S2	Switch for rotational break release
=AB+A1-S3	Switch release all brakes
=AB+A1-S4	Switch release all brakes
=AB+A1-S5	Switch for rotational break release
=AB+A1-S6	Switch for vertical brake release
=AB+A1-V1	LED -Stand - Bucky centring
=AB+A1-V2	LED -Exposure height
=AB+A1-V3	LED - for horizontal SID
=AB+A1-V4	LED - Tube select
=AB+A1-V5	LED - rotation angle 0°, +/-90°
=AB+A1-V6	LED - vertical SID
=AB-PE	Main Grounding bolt
=AB	**Stand**
=AB-S1	SID switch vertical
=AB-X2	Plug-in connection for tube support arm
=AB-X3	Plug-in connection for vertical brake
=AB-X4	Plug-in connection for horizontal brake
=AB-X5	Plug-in connection for collimator
=AB-X6	Terminal strip in the tube support arm
=AB-X7	Plug-in connection in vertical brake
=AB-X9	Plug-in connection for =AC-S3
=AB-Y1	Vertical brake
=AB-Y2	Horizontal brake
=AB-Y3	Tube rotation brake
=AC	**Tomo**
=AC +A1	**Interface board**
=AC +A1-X1	Plug connection power supply
=AC +A1-X2	Plug connection data wiring column
=AC +A1-X3	Plug connection data
=AC +A1-X4	Plug connection data wiring Bucky
=AC +A1-X5	Plug connection data control panel
=AC +A1-X6	Plug-terminal strip entrance
=AC +A1-X7	Plug-terminal strip interface signal
=AC +A1-X8	Plug connection / O signal to +AG

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1.14 Description of components for circuit diagram page 2

=AC +A2 Control panel

=AC +A2-X1 Plug-terminal strip power supply EMERGENCY-STOP
=AC +A2-X2 Plug connection data wiring
=AC +A2-R10 Adjustment resistor for display contrast
=AC +A2-S1 Switch prep.
=AC +A2-S2 Switch fulcrum up
=AC +A2-S3 Switch test run
=AC +A2-S4 Switch Tomo-time
=AC +A2-S5 Switch tomographic angle
=AC +A2-S6 Switch fulcrum down
=AC +A2-S7 Switch operating method Tomo
=AC +A2-S8 Switch Bucky Wall Stand A-Pos.
=AC +A2-S9 Switch Bucky Wall Stand B-Pos.
=AC +A2-S10 Switch operating method Bucky Wall Stand
=AC +A2-S11 Switch operating method table exposure

=AC +A3 Column Motion controller

=AC +A3-X2 Plug connector data wiring
=AC +A3-X3 Plug connector clutch Potentiometer
=AC +A3-X4 Plug connector impulse sender
=AC +A3-X5 Plug terminal strip in-output
=AC +A3-X6 Plug connector for end...board
=AC +A3-X11 Plug connector motor impulse sender

=AC +A4 Amplifier board

=AC +A4-X1 Plug connector for motion controller
=AC +A4-JP1 Terminal strip power supply motor

=AC +A5 Tube Motion controller

=AC +A5-X1 Plug connector power supply
=AC +A5-X2 Plug connector data wiring
=AC +A5-X3 Plug connector motor clutch Potentiometer
=AC +A5-X4 Plug connector impulse sender
=AC +A5-X5 Terminal strip in-output
=AC +A5-X11 Terminal motor impulse sender

=AC +A6 Bucky Motion controller

=AC +A6-X1 Plug connector power supply
=AC +A6-X2 Plug connector data wiring
=AC +A6-X3 Plug connector motor clutch Poti
=AC +A6-X4 Plug connector impulse sender
=AC +A6-X5 Terminal strip in-output
=AC +A6-X8 Plug connector I / O signal to +A1
=AC +A6-X11 Plug connector motor impulse sender
=AC -C1 Capacitor
=AC -C2 Capacitor
=AC -F1 Fuse primary
=AC -F2 Fuse tube stand drive
=AC -F3 Fuse tube drive

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1.14 Description of components for circuit diagram page 3

=AC -F4	Fuse Bucky drive
=AC -F5	Fuse control panel
=AC -F6	Fuse interface
=AC -T1	Transformer
=AC -Z1	Filter
=AC -V1	Rectifier
=AC -V2	Rectifier
=AC -M1	Drive motor column
=AC -M2	Drive motor tube
=AC -M3	Drive motor Bucky
=AC -R1	Potentiometer column
=AC -R2	Potentiometer tube
=AC -R3	Potentiometer Bucky
=AC -S1	Security end switch column
=AC -S2	Security end switch column
=AC -S3	Switch column not turned
=AC -S5	Switch NOT STOP
=AC -X1	Terminal strip Tomo control
=AC -X11	Terminal strip clutch column
=AC -X12	Terminal strip motor tube
=AC -X13	Terminal strip motor, clutch Bucky
=AC -U1	Impulse sender column
=AC -U2	Impulse sender tube
=AC -U3	Impulse sender Bucky
=AC -U4	Impulse sender motor impulse sender column
=AC -U5	Impulse sender motor impulse sender tube
=AC -U6	Impulse sender motor impulse sender Bucky
=AC -Y1	Motor clutch column
=AC -Y2	Motor clutch tube
=AC -Y3	Motor clutch Bucky
=AF+A1	**Control Board Elevator-2**
=AF +U1	**Frequency Converter**
=AF -F1	Fuse transformer primary
=AF -F2	Fuse 24 V
=AF -F3	Fuse 20 V AC, 20 V AC
=AF -F5	Fuse mains input
=AF -F6	Fuse +12 V DC
=AF -F7	Fuse -12 V DC

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1.14 Description of components for circuit diagram page 4

=AF -K1	Motor conductor
=AF -K2	Relay motor conductor
=AF -K4	Relay n>0
=AF -K5	Relay safety switch
=AF -K6	Relay intermediate
=AF -K7	Relay exposure height
=AF -M1	Vertical motor
=AF -PE 1	Main ground stat
=AF -Q1	Service switch
=AF -R1	Height potentiometer
=AF -R2	Trimmer disconnection vertical
=AF -R3	Trimmer intermediate stop
=AF -R4	Trimmer exposure position stop
=AF -R5	Trimmer exposure position hysterese
=AF -R6	Trimmer disconnection at the bottom
=AF -R7	Trimmer slow motion range
=AF -R8	Trimmer slow motion time
=AF -S2	Service - switch
=AF -S3	Switch for brake of Bucky carriage
=AF -S4	Safety limit switch
=AF -S5	Safety push bottom
=AF -S10	Pedal for table top brake
=AF -S11	Pedal for Table top brake
=AF -S12	Pedal for vertical upwards
=AF -S13	Pedal for vertical downwards
=AF -S17	Jumper safety relay
=AF -T1	Mainstransformer
=AF -T2	Transformer for electronics
=AF -V1	LED motor relay
=AF -V3	LED -12 V DC
=AF -V4	LED +12 V DC
=AF -V5	LED +24 V DC
=AF -V6	LED safety switch
=AF -V7	LED pedal vertical up
=AF -V8	LED pedal vertical down
=AF -V9	LED limit switch vertical up
=AF -V10	LED limit switch vertical down
=AF -V12	LED disconnection vertical at the top
=AF -V13	LED intermediate stop
=AF -V14	LED exposure height
=AF -V16	LED disconnection vertical upwards
=AF -V17	LED slow motion range
=AF -V18	LED slow motion time
=AF -V20	LED frequency converter vertical upwards

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1.14 Description of components for circuit diagram page 5

=AF -V21	LED frequency converter vertical downwards
=AF -V22	LED frequency converter slow motion
=AF -V23	LED frequency converter n>o
=AF -X1	Terminal strip
=AF -X2	Plug in connection to motor
=AF -X3	Plug in connection to transformer
=AF -X4	Plug in connection to motordrive
=AF -X4a	Plug in connection to anti collision drive
=AF -X4b	Plug in connection to anti collision drive
=AF -X5	Plug in connection to pedal strip
=AF -X7	Plug in connection to left transverse brake
=AF -X8	Plug in connection to right transverse brake
=AF -X9	Plug in connection on Bucky carriage
=AF -X10	Plug in connection mains input
=AF -X11	Plug in connection to height measuring unit
=AF -X12	Plug in connection to control signal
=AF -X13	Plug in connection to U1 control signal
=AF -X14	Plug in connection to U1 motor voltage
=AF -X15	Plug in connection for Combi-Elevator
=AF -X16	Test socket
=AF -X16:1	Test point ground
=AF -X16:2	Test point +12 V DC
=AF -X16:3	Test point -12 V DC
=AF -X16:4	Test point 0 V DC
=AF -X16:5	Test point +24 V DC
=AF -X16:6	Test point actual value height measuring-R1
=AF -X16:7	Test point nominal value disconnection top
=AF -X16:8	Test point nominal value intermediate stop
=AF -X16:9	Test point nominal value exposure pos. stop
=AF -X16:10	Test point nominal value exposure pos. hyst.
=AF -X16:11	Test point nominal value disconnection bot.
=AF -X16:12	Test point nominal value slow motion range
=AF -X16:13	Test point time impulse exposure
=AF -X16:14	Test point memory signal exposure position
=AF -X16:15	Test point time impulse exposure position
=AF -X16:16	Test point Pedal vertical up- or downwards
=AF -Y2	Brake table top transverse left
=AF -Y3	Brake table top longitudinal
=AF -Y4	Brake table top longitudinal
=AF -Y5	Brake table top transversal right
=AF -Q1	Service switch
=AG	Combi Elevator-2
=AG-K1	Relays for vertical SID
=AG-X1	Terminal block for vertical SID
=AG-X2	Connector to column
=AG-X3	Connector to tomo

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2. Mounting

2.1 Preparing the Floor

Drill holes for the floor mounting of the equipment as shown in dimensional drawing, page 6, with a 12 mm/.472 in. drill.
To ensure full range motion of the system components, keep the minimum distances as indicated.
The bolts must be suitable for 2500 N tensile stress at each mounting point. E.G. Liebig security anchors S12/65 N for B 150 DIN 1045 concrete floor.
Remove the vinyl or carpet floor covering around the mounting points for the base of the unit.
Lay floor covering shims (installation material, included with the shipment) of the same thickness as the original floor covering at the mounting points.

2.2 Uncrating and Preparing the Table

Remove packing material. Establish a provisional power supply with the assembly connecting cable (Fig. 1/Pos. 6) and lift the table to maximum height. Take off plastic covers (Fig.1/ Pos. 1). Loosen the Allan screws underneath with a 4 mm Allan wrench. Swivel the top cover (Pos. 2) forward and lift off by pulling upward.

Fig. 1

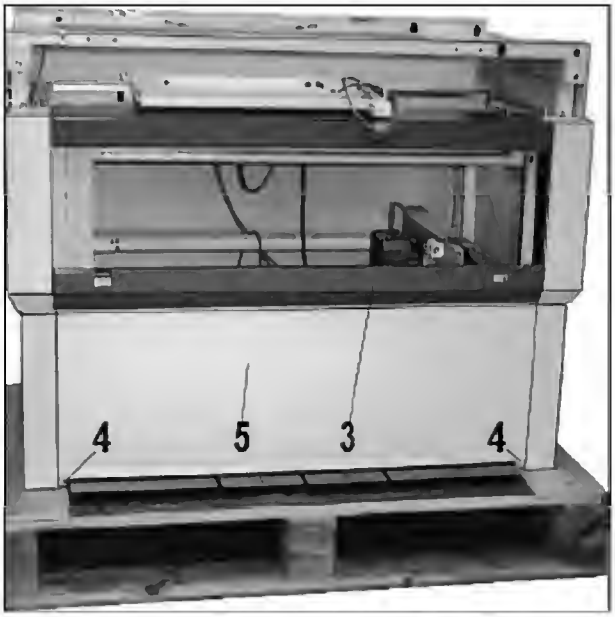

Fig. 2

Remove both Allan screws and connecting bar (Fig. 2/ Pos. 3). Loosen Allan screw (Pos. 4). Swivel the cover (Pos. 5) at the bottom forward and pull out downward.

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Loosen the Transport screws (Fig. 3 /Pos. 5) from the palette. Tilt table to the back, pull out palette to the front and take off the table carefully.

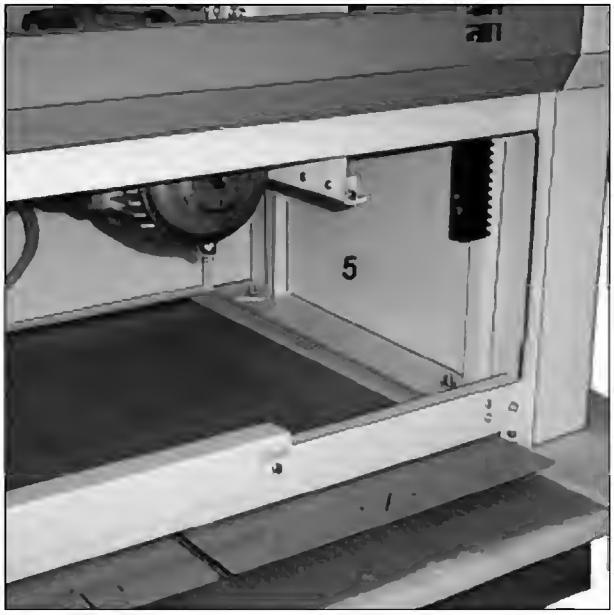

Fig. 3 Fig. 4

Remove both end covers (Fig. 5/Pos. 7 and 8) and loosen the transport security screws of the rail stand, then push to the bottom. Remove rail stand from the palette and take to the assembly area. Dismount transport security plates of the column. (Leave column on the palette until assembly). Unpack equipment parts and check for completeness according to shipping list respectively order. Check complete delivery upon damage before assembly start.

Fig. 5 Fig. 6

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2.3 Assembly of the table and rail stand

Attention: The equipment will be shipped for Bucky Wall Stand left-hand. For Bucky Wall Stand right-hand prepare rail stand according to chapter 2.17.

Take the table to installation point. Place the rail stand behind the table. Align the rail stand (Fig. 5/Pos.9) to the right or left side of the table (Fig. 6/Pos. 10) depending on the way of assembly (according to drawing for installation of a Bucky wall stand left or right).

Fig. 7

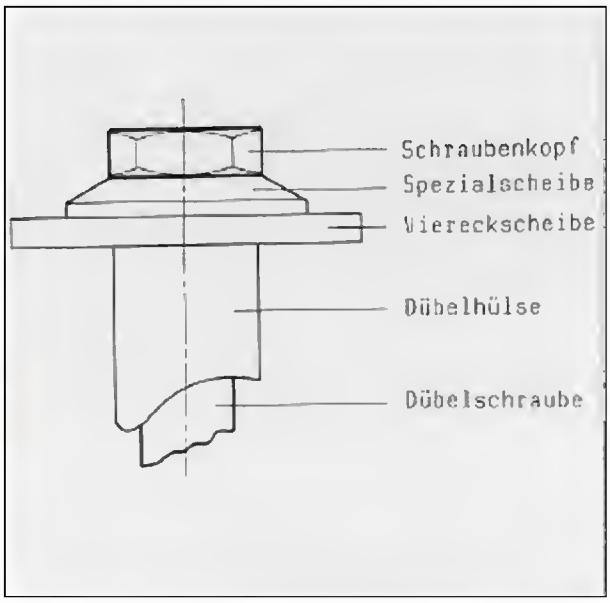

Fig. 8

Fasten the rail stand (Fig. 7/Pos. 9) with 4 screws to the fastening points (Fig.6/Pos. 10) of the table. Push table with rail stand over the fastening bore-holes at the assembly place. Respectively align the table at the assembly place, mark the 5 fastening bore-holes and bore. Insert the included set pin (Fig. 8) and insert screws and washers.

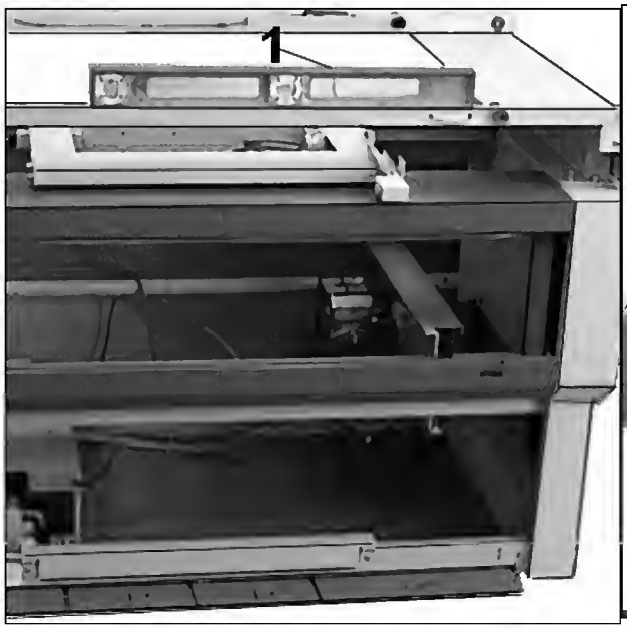

Fig. 9

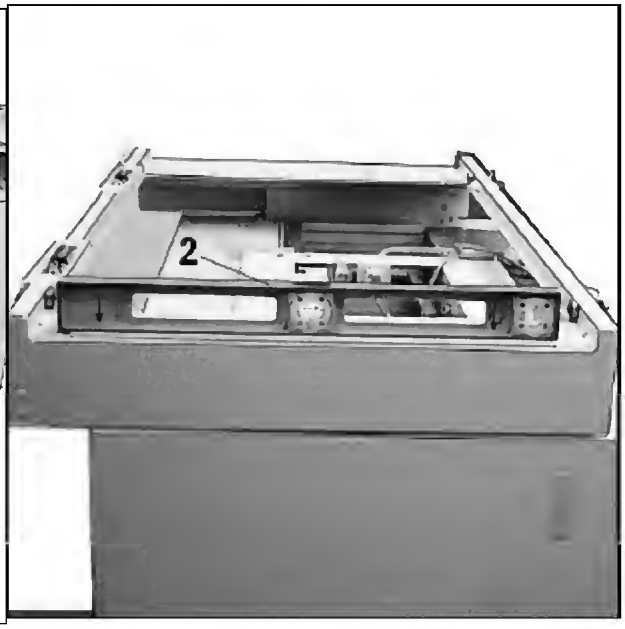

Fig. 10

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Align table with rail stand according to liquid level (Fig. 9/Pos. 1, Fig. 10/Pos. 2 and Fig. 12/Pos. 1 and 2). If necessary, align with washers (Fig. 11/Pos. 1).
Attention: Do not deform equipment base in neither direction.
Fasten all screws tightly.

Fig. 11

Fig. 12

2.4 Assembly of the column

The column will be shipped with the counterweights in place. The counterweight in the column is secured for the transport with two screws.

Attention:
Do not remove the security bolts before assembly of the tube and collimator.

To insert the column into the rail stand easily, an assembly plate is included to the shipment. It is constructed so that it can slide on a normal floor easily.
Dismount limit stop (Fig. 13 Pos. 1) from the rail stand.
Set up column (Fig. 14/Pos. 1) and place on the assembly plate (Pos. 2). Push the assembly plate to the rail stand and align (Fig. 14/Pos. 2). Insert the column from the assembly plate into the rail stand.

Remark:
When inserting pay attention to the bearing and brake magnet.

Remount the limit stop (Fig. 13/Pos. 1) to the rail stand.

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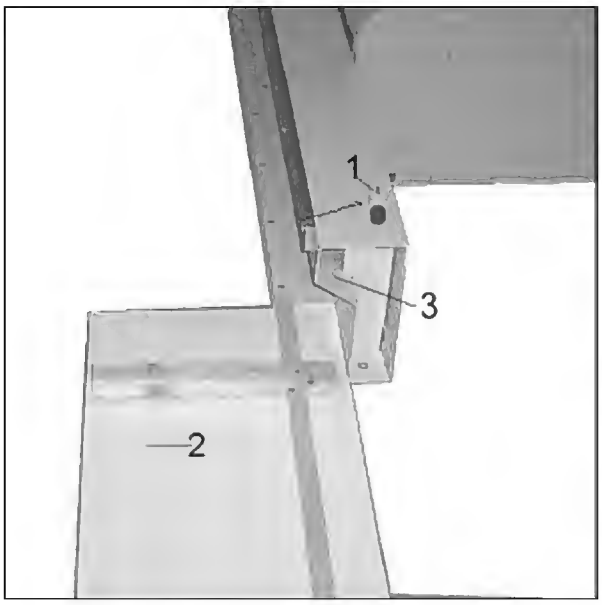

Fig. 13

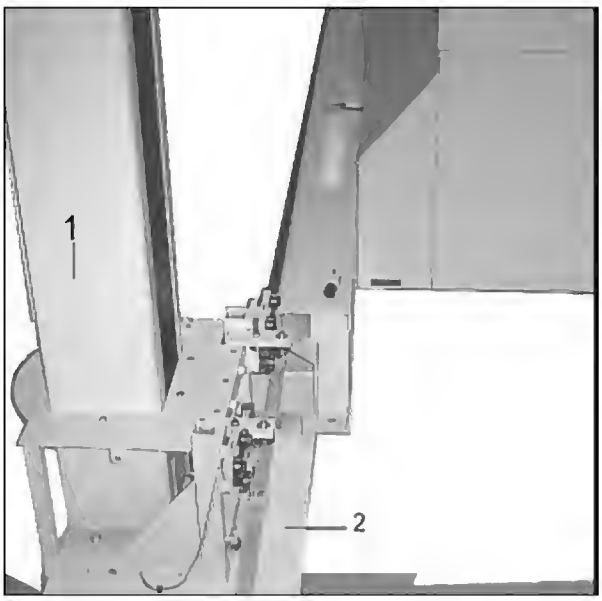

Fig. 14

Mount the cable guide chain (Fig. 15/Pos. 1) to the rail stand - back wall - and to the column carriage (Pos. 2). Insert the end of the cable (Pos. 3) into the table and connect all cables according to the wiring diagrams. Mount the distributing plate (Pos. 4) to the column carriage.

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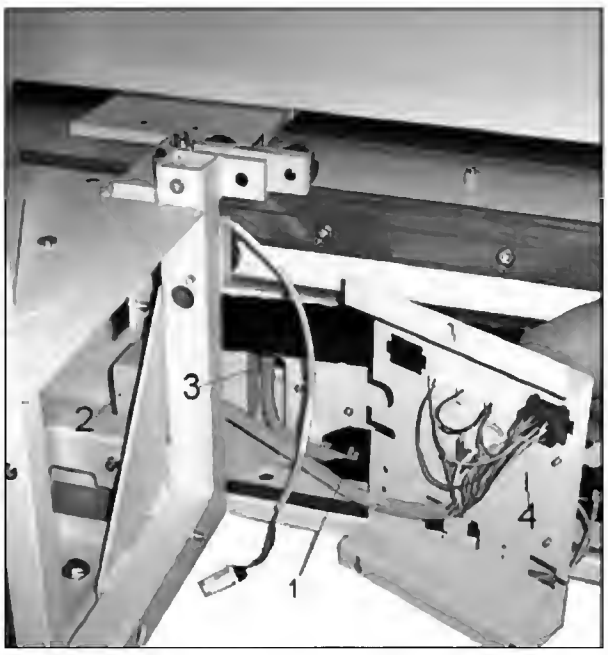

Fig. 15

Fig. 16

2.5 Assembly of Bucky

Remark:
Buckys of different manufacturers can be installed. The equipment will be prepared according to the customer order and the necessary fastening materials will be included to the shipment.

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Insert the Bucky (opening of cassette to the front) in the Bucky carriage (Fig.16/Pos.1).
Install connection cable and detector cable according to the instructions of the manufacturer.

Bucky P
Fastening with 2 screws each (Fig. 16/Pos. 3) left and right lateral. Put at the top the cover angle with the longer side (Fig. 16/Pos. 4) to user- and back side and fasten above with 3 screws each and U-washer.

Philips
Fastening with 2 screws (Fig. 16/Pos. 3) left and right lateral. Put at the top the cover angle with the longer side (Fig. 16/Pos. 4) to user- and back side and fasten above with 3 screws each.

Siemens
Fastening with 2 screws each (Fig. 16/Pos. 3) left and right lateral.

2.6 Assembly of the table top

Remark:
If there is less than 2900 mm from the mid of table to a wall available, please mount the table plate according to section 2.6.1.

Remove table top out of packing.
Dismount on one grinding the limit stop (Fig.20/Pos.1) and push the table top (Fig.17/Pos. 2) on the transverse carriage.

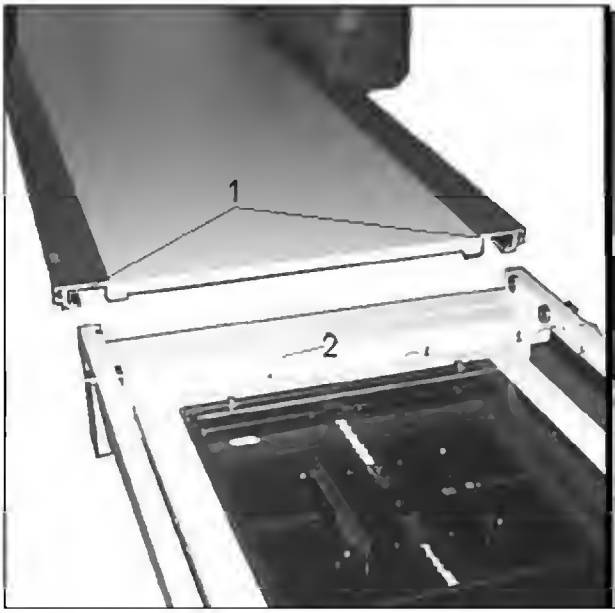

Fig. 17

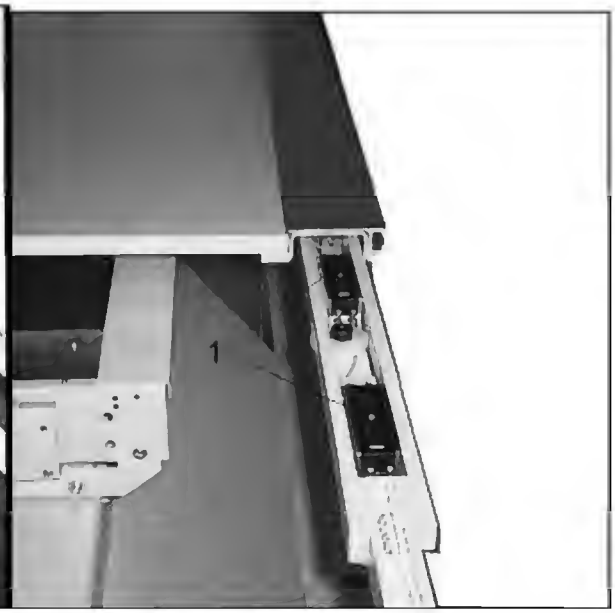

Fig. 18

Attention: Pay attention to the brake magnets (Fig. 18/Pos. 1) while inserting the table top.

Remount limit stops (Fig. 20/Pos. 1)

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Put the included cardboard of the table top packing on the table top during assembly to avoid any damages.

2.6.1 Assembly of the table top in small rooms

Dismount on both grindings the limit stops Fig. 20/Pos. 1). Dismount the front bearings (Fig. 19/Pos. 1 and 2) and the plastic guide rolls.

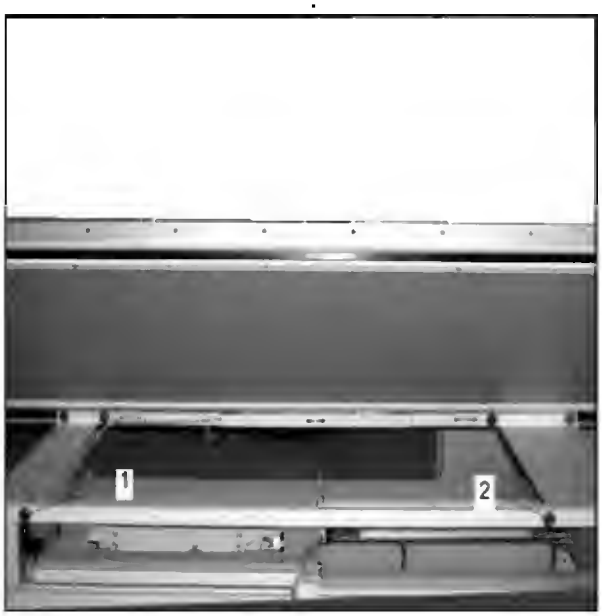

Fig. 19

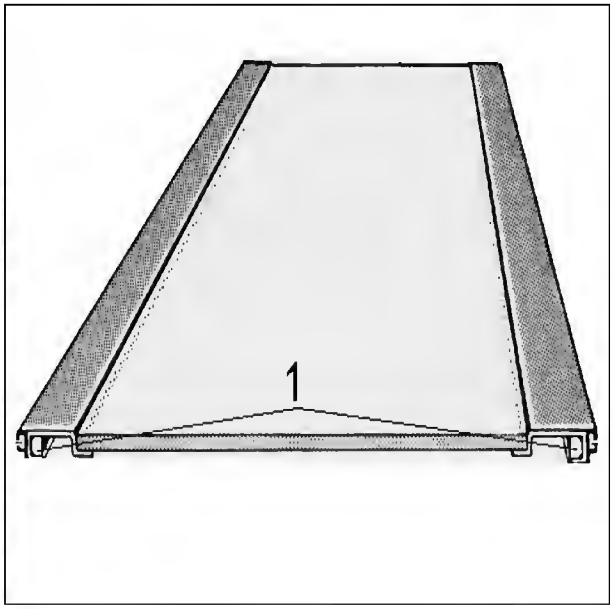

Fig. 20

Put the table top on the table frame and lift the table top on the user side about 45°. Put meanwhile the table top rail from behind over the Polyamid roll and bearings. Lower the table top carefully. Move the table top longitudinal and remount the dismounted bearings. Readjust the regulations of the eccentric. Remount the limit stops (Fig. 20/Pos. 1).
Put the included pasteboard of the table top packing on the table top during assembly to avoid any damages.

2.7 Assembly of the tube and collimator

Siemens

Dismount the intermediate ring (Fig. 21/Pos. 59). Mount the window flange (Pos. 58) between the adjusted flange (Fig. 21/Pos. 57) and mount to the tube housing.

Collimat

Dismount the intermediate ring (Fig. 22/Pos. 1) out of the collimator (Pos. 2). Mount the window flange (Fig. 22/Pos. 3) with the control arm to the tube housing. Put the collimator (Pos. 2) onto the intermediate ring (Pos. 5) and fasten with fixing plates (Pos. 4).

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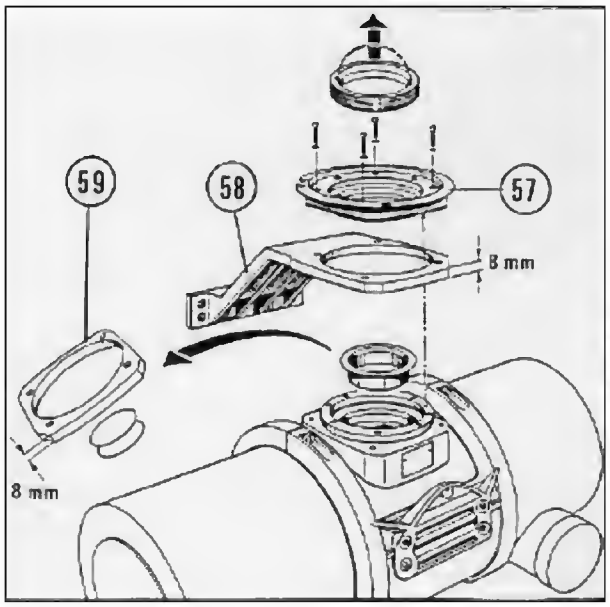

Fig. 21

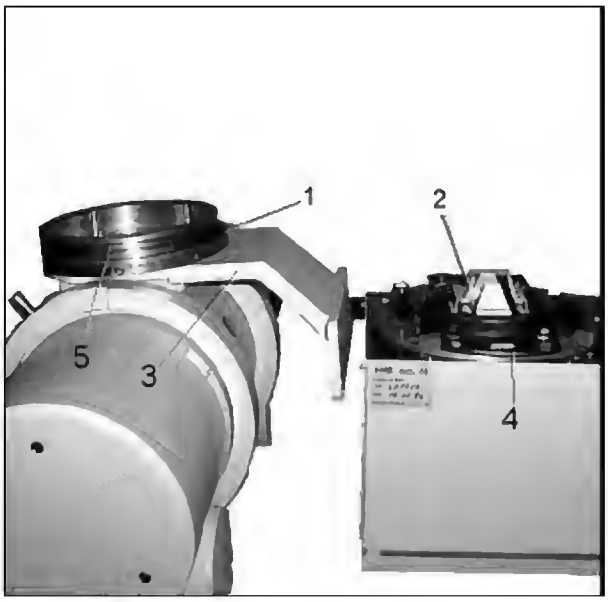

Fig. 22

Philips

Mount the control arm with the Z-angle (Fig. 23/Pos. 1) to the Rotalix.

Other manufacturer

Put the window flange (Fig. 24/Pos. 1) onto the tube housing (Pos. 4), fasten the flange plate with the intermediate ring (Pos. 2) and mount the collimator onto the flange plate.

USA version

Mount the support angle (Pos. 25/Pos. 1) between tube housing (Pos.2) and collimator.

Fig. 23

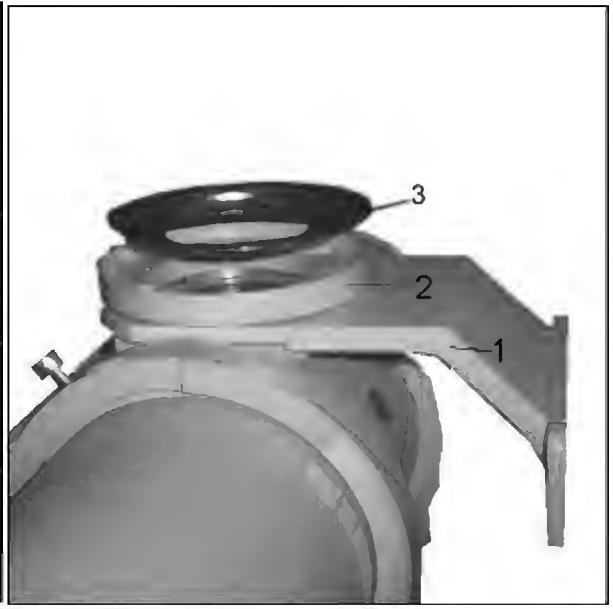

Fig. 24

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2.8 Assembly of the tube holding support

Remove the upper screws (Fig. 26/Pos. 1) and loosen the lower screws (Pos. 2) approx. 10 mm. Remove the cover of the tube holding support (Fig. 27/Pos. 1).
Put the tube holding support to the carriage support and insert the cable for the SID switch (Fig. 26/Pos. 3) in the tube holding support. Put in over the lower screws and fasten with the upper screws (Fig. 26/Pos. 1) the tube holding support to the vertical carriage.

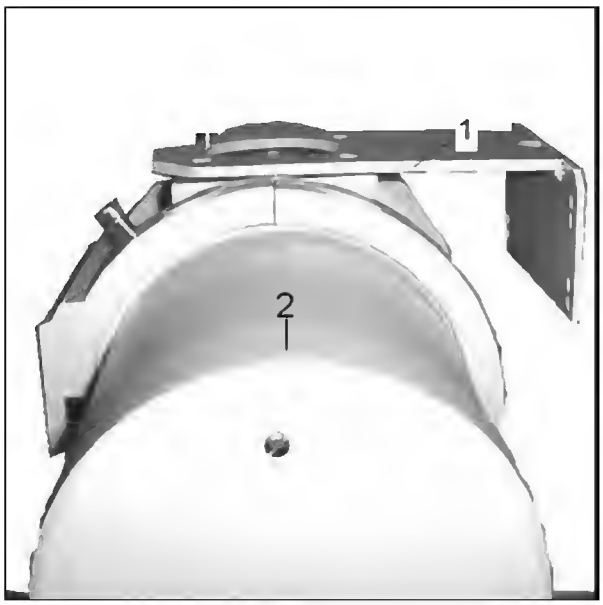

Fig. 25

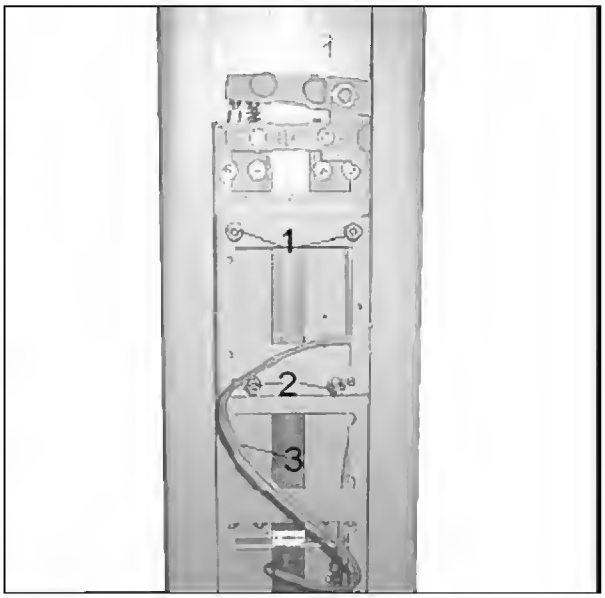

Fig. 26

Fasten the lower screws (Fig. 26/Pos. 2). Lift the tube holding support slightly, then push on safety brake (Fig. 28/Pos. 1) and lower the tube holding support slowly.
Tighten the rope and the tube holding support is suspended to the rope. Install cable for SID switch in support arm.

2.9 Assembly of the tube on tube holding support

Move the centre gravity of the tube/collimator/control board unit into the rotation axis by displacing the unit vertically (in direction of x-rays) on the compensating plate (Fig.27/ Pos. 3). Insert spacer plate (Pos. 5) if necessary.

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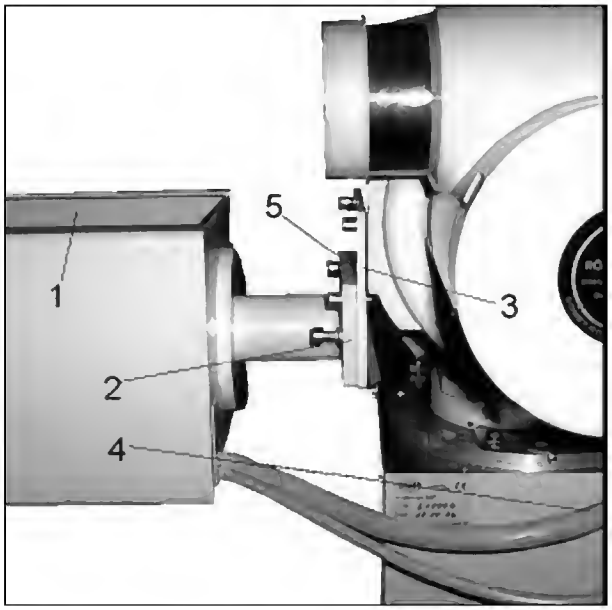

Fig. 27

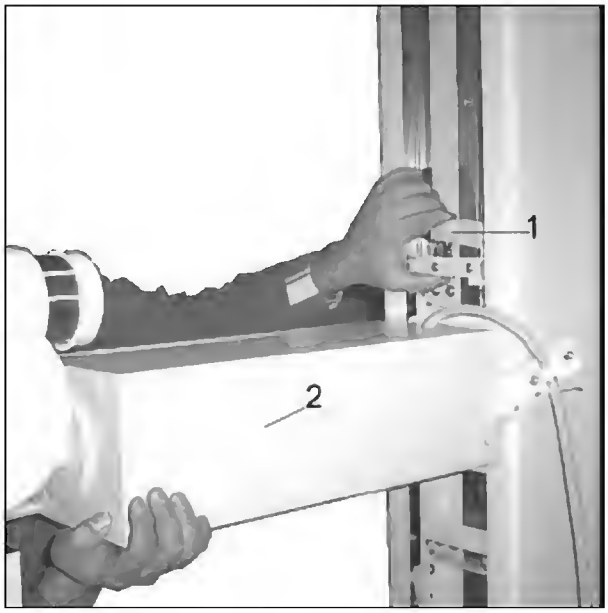

Fig. 28

Note: The compensating plate must be installed as distance plate, even if the centre of gravity lies in the rotation axis. Then fasten with the 4 screws (Pos. 3).

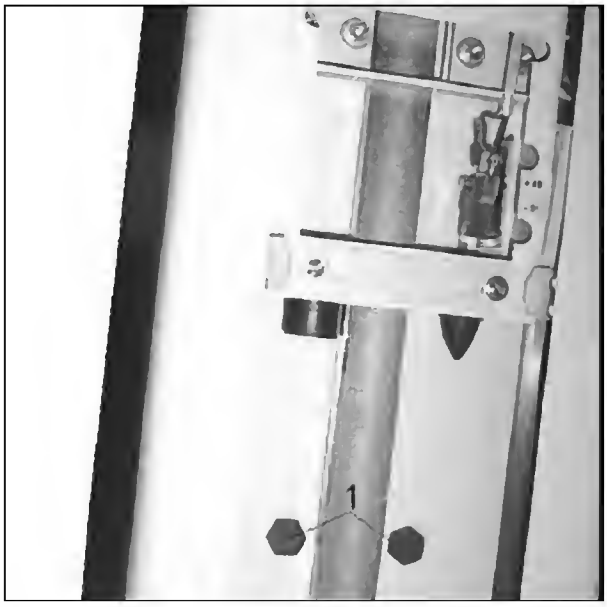

Fig. 29

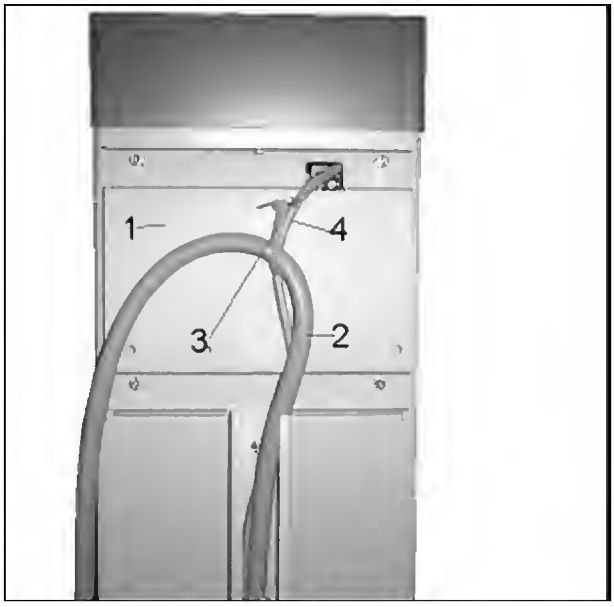

Fig. 30

Remove transport security screws (Fig. 29/Pos. 1) and insert in the head part the nuts (Fig. 33 /Pos. 1).

2.10 Assembly of the control arm

Dismount the cover (Fig. 32/Pos. 1) on the control arm (Pos. 2). Remove the 4 screws (Pos. 3) and mount the cover onto the control arm fastening. Cut in the cable (Fig. 27/ Pos. 3) into the control arm and bring it to the cover. Then fasten with the 4 screws (Pos. 3).

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2.11 Assembly and installation of the cable

Mount the cable box (Fig. 30/Pos. 1) to the head of the column. Remove the cover of the cable tunnel. Insert the cable in the cable trough (Pos. 2) on the backside of the column. Screw down the cable collar in the cable tunnel (Fig. 31/Pos. 1). Plug in the plugs in the distributor plate (Fig. 12/Pos. 4). Tighten the cable to the cable box (Fig. 30/Pos. 1) and fasten with cable binder (Pos. 2). Install cable for vertical brake (Pos. 4) and earth cord in head part. Put cover onto the cable tunnel. Install the high-voltage cable to the tube. Place cable over the cable collar of the vertical carriage to the cable box on the backside of the column.

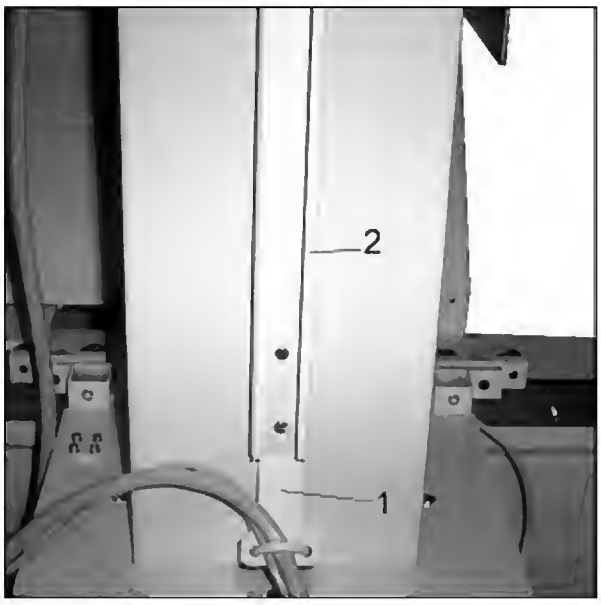

Fig. 31

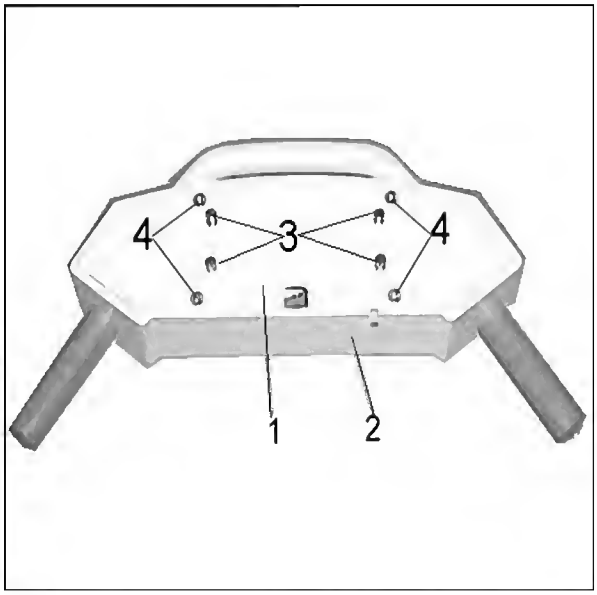

Fig. 32

Leave enough loose cable next to wall terminal box or ceiling terminal box (option). Continue the running cables to the x-ray generator, install according to the installation plan of the x-ray generator.

2.12 Counterweight on the column

The tube holding support must be counterbalanced with the installed cables. Loosen brake and check the counterweight. If there is a ascending force of the tube holding support remove weight plates out of the counterbalance box.
If there is a descending force of the tube holding support put in weight plates in the counterbalance box.

Note:
Determine the weight difference with the spring balance. Drive column beside table and pull the tube holding support to the bottom. Secure counterbalance box with the security screw Fig. 30/Pos. 1). Lift the tube holding support (Fig. 28/Pos. 2) min. 20 cms. The tube holding support is suspended in the falling brake and the robe is not fixed.

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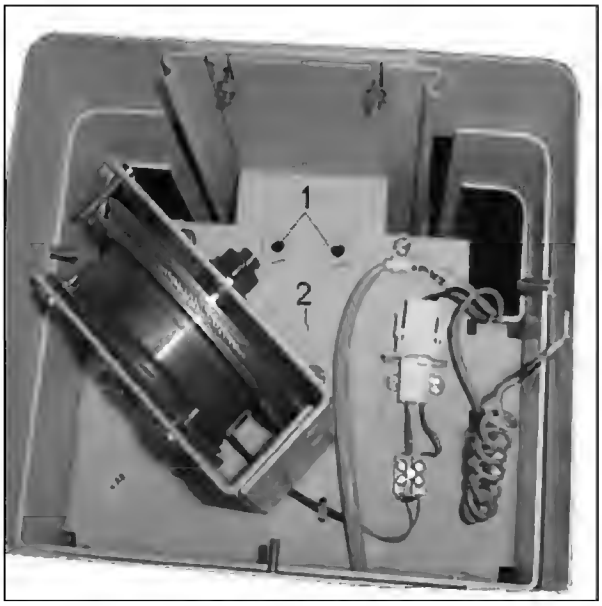

Fig. 33

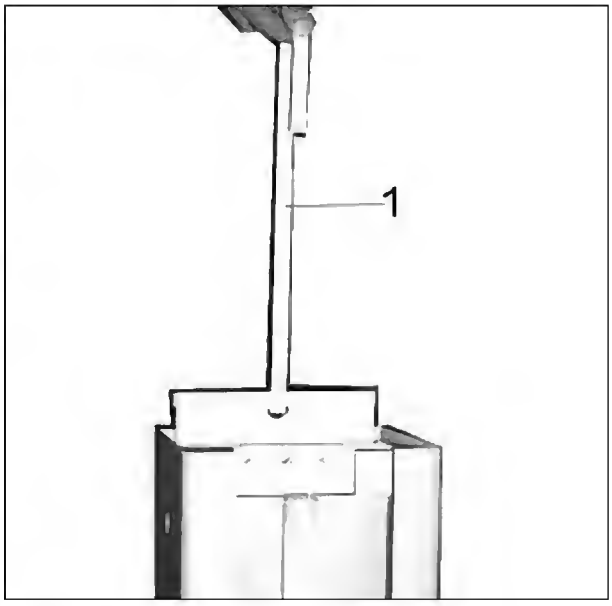

Fig. 34

Lift the head part (Fig. 33/Pos. 2) with the rope pulley and secure with a cord. Balance the calculated weight difference with the weight bracket (Fig. 34/Pos. 1). Remount the head part.

Push the tube holding support slightly to the falling brake (Fig. 30/Pos. 1) and lower slowly the tube holding support until it is fixed to the robe.

2.13 Mounting of column drive motor

Install both cables from the distributing plate between transverse bracket and tube stand and connect with cable binder on below transverse bracket. Mount the end switch to the column carriage and cable. Fasten the motor assembly for column (Fig. 36/Pos.3) to the column carriage (Pos.1). Fasten each end of the belt (Pos.4) of both sides to the rail stand (Pos. 5). Determine the power of the belt as follows:
Apply spring balance in the middle of the rail stand to reach with 30 N force a deviation from the straight line of 2 cm. Can be adjusted on the right end of the rail stand with the tension screw.
Mount control board (Fig. 35/Pos.2 to the column carriage (Pos. 1).
Connect both connection cables, motor cable and the impulse sender cable.

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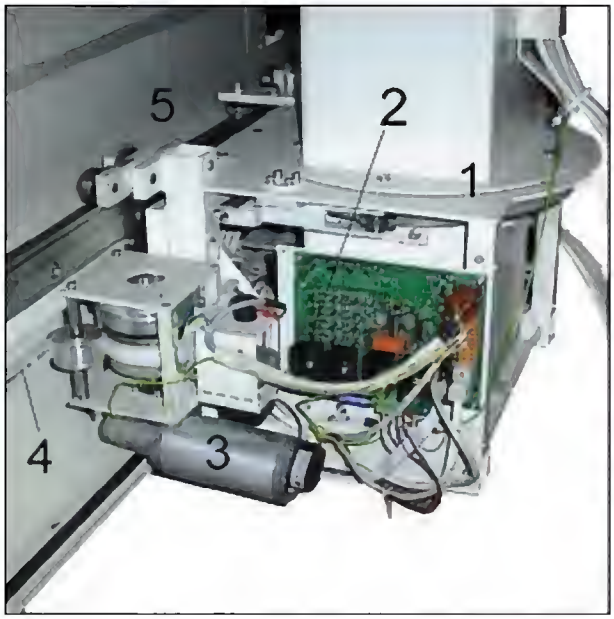

Fig. 35

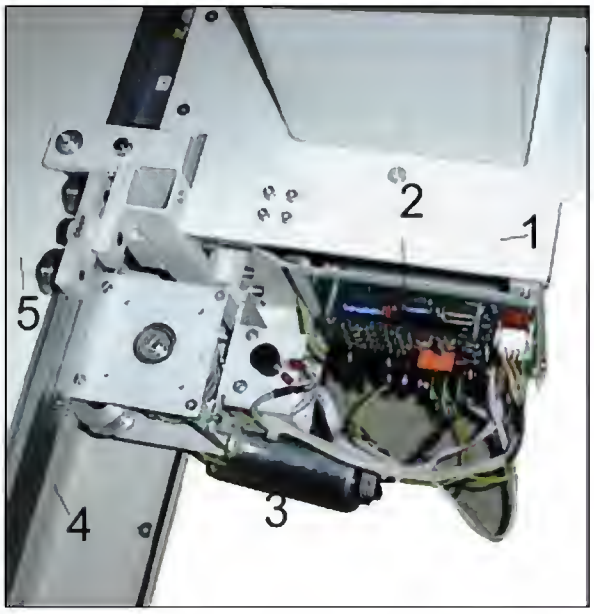

Fig. 36

2.14 Starting of Tomo

Attention:
When mounting a Bucky Wall Stand right hand please install software before switching-on the equipment. Please follow chapter 3.9.

When switching on the unit it checks automatically after initialisation of the control to duck that all axis are in zero position. The axis will correct themselves in millimetre range, if they are not on the rotation resistor index but in near to the zero point. A preparation drive is required as soon as the zero point range has been left to ensure that in case of overflow of the index marks in the zero position the indicators will be set accordingly. In this case all three operating methods SIDs on the control handle will flash on and the preparation drive will be activated while pushing the PREP-switch. After that the unit will be in table mode. Do not push the emergency-stop while performing the drive and adjust the vertical first draw SID to avoid any collision.

Control panel instructions

Power Switching- on

Initialisation

searching index

searching index
press PREP key

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searching index
reset emergency-stop

searching index
center column.

Table mode

table exposure

table exposure
reset emergency-stop

Wall mode

SID wall stand
A= xxx cm B= xxx cm
A=xxxinch B=xxxinch

SID wall stand
reset emergency-stop

SID wall stand
center column

SID wall stand
adjust vertical SID

SID wall stand
rotate column

Tomo mode

tomo-preparation
press PREP key

tomo-preparation
reset emergency-stop

tomo preparation
center column

tomo preparation
adjust table height

tomo preparation
adjust vertical SID

tomo preparation

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rotate column

angle time height
xxdeg x.xsec xx.xcm

test run
xxdeg x.xsec xx.xcm

exposure preparation
xxdeg x.xsec xx.xcm

ready for exposure
xxdeg x.xsec xx.xcm

exposure
xxdeg x.xsec xx.xcm

2.15 Function control

Switch in x-ray generator and check all functions. If necessary perform corrections according to chapter 3. Adjustment.

2.16 Assembly of covers

Mount the lower table cover (Fig. 2/Pos. 5), connection part and upper cover (Fig. 2/Pos.2).

Drive vertical carriage to the head side and insert lower center cover (Fig. 37/Pos. 1). Drive vertical carriage carefully down.

Attention:
The lower center cover has to be guided from the coulisse. Stick the upper center cover (Fig. 37/Pos. 2) to the lower center cover (Pos. 1).

Drive the vertical carriage to the head side and fasten the center cover with the front border.

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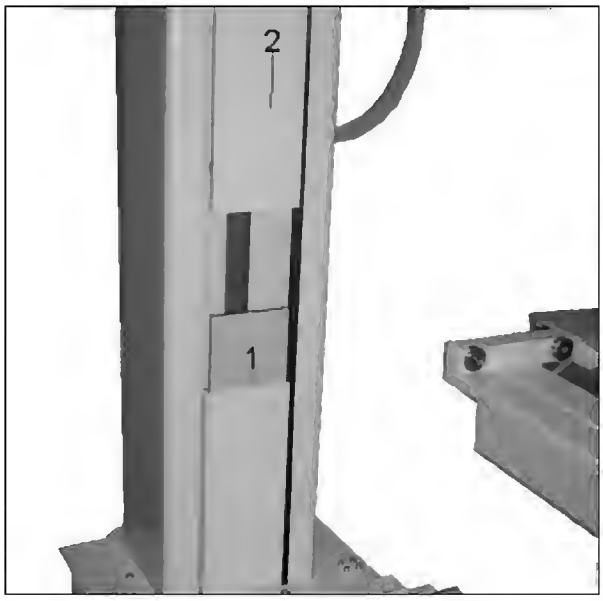

Fig. 37

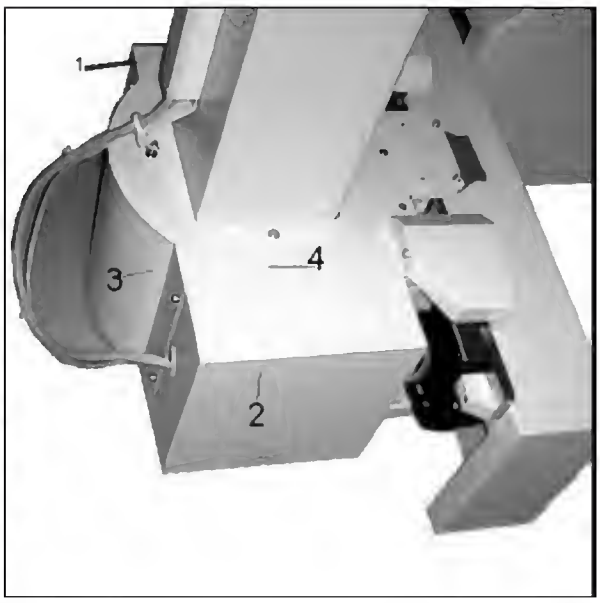

Fig. 38

Mount the left cover (Fig. 38/Pos. 1), the right cover (Pos. 2) and the cap (Pos. 3) to the column carriage (Pos. 4)

2.17 Reconstruction of rail stand

Dismount the left cover (Fig. 38a/Pos. 1) and the right cover (Pos. 2) and remount both covers.

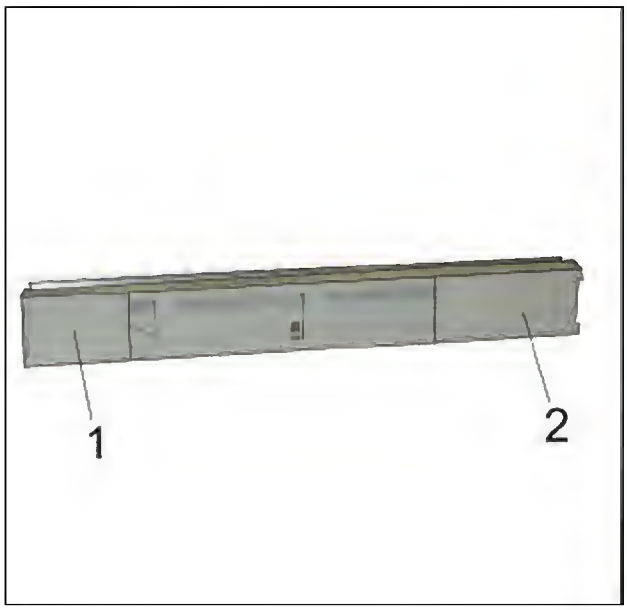

Fig. 39

Fig. 40

2.18 Reconfiguring the control panel for right hand version

Open cover of control panel (Fig. 38b/Pos. 1) and squeeze off both cables. Take out both cables (Pos. 2) and remove control panel. Dismount the control panel fastening (Pos. 3) for the table transverse frame (Pos. 4). Remove both screw nuts (Pos. 6) and pull out the turn-

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ing part (Pos. 7) from emergency-stop switch and remount laterally transposed. Adjust the friction with both screw nuts (Pos. 6) and mount the control panel fastening on the other table transverse frame side. Fasten the control panel with both screws (Pos. 2), squeeze against both cables and remount the cap.

Clean equipment afterwards with a mild cleaning agent.

3 Adjustment

3.1 Adjustment of the vertical column

The column has been aligned during manufacturing. If the alignment is not vertical after assembly align the column.

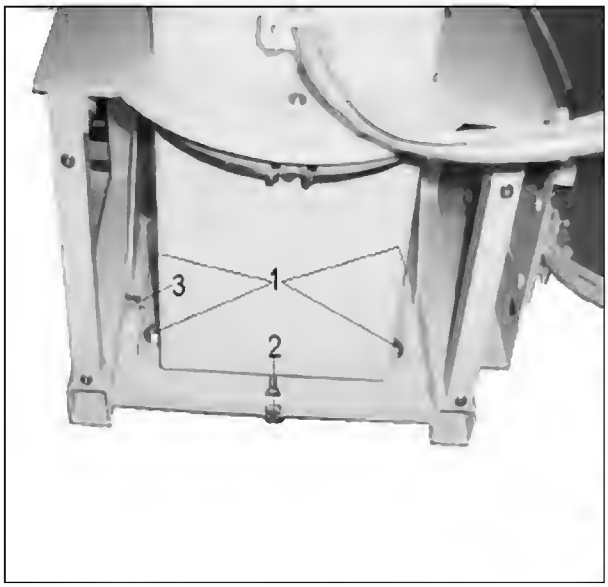

Fig. 41

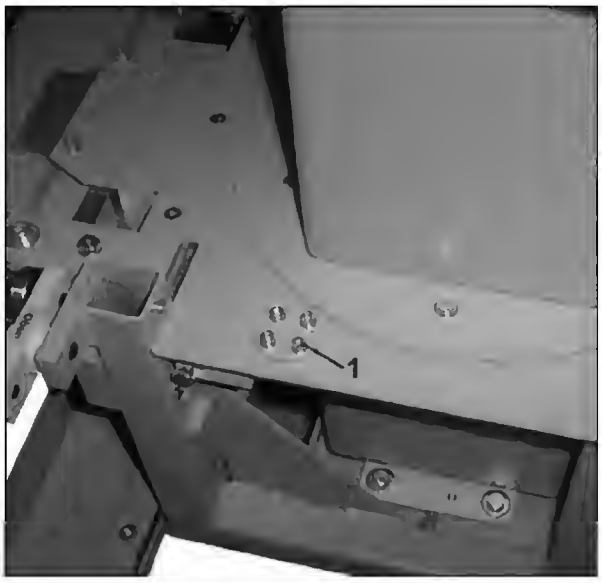

Fig. 42

Remark: Remove the cover plates (Fig. 41/Pos. 1-3) from the column carriage (Pos. 4). Turn the column at 45°. Loosen the 4 screws (Fig. 41/Pos. 1). Bring the column in the right position with the corresponding adjusting screw (Pos. 2 or Pos. 3). Fasten again the 4 screws (Pos. 1) and remount the covering plates again.

3.2 Adjustment of the column in direction of rotation

The tube holding support has been aligned during manufacturing. If the alignment is not correct after assembly please align.

Remark:
Loosen the 4 screws (Fig. 42/Pos. 1) slightly. Adjust the column in the corresponding direction. Fasten the 4 screws (Pos. 1) afterwards tightly.

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Fig. 43

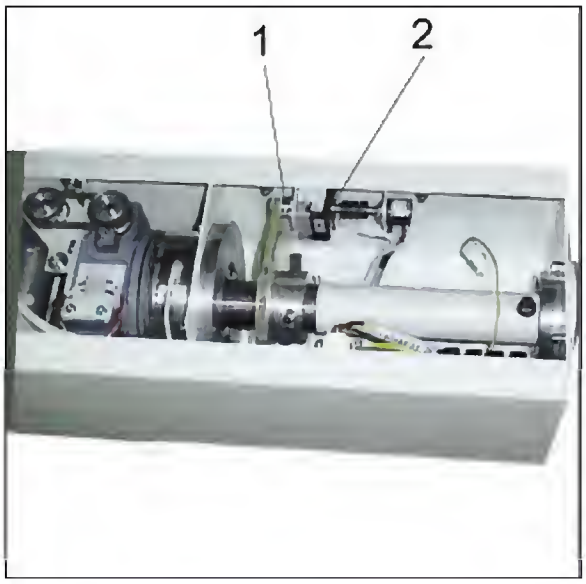

Fig. 44

3.3 Adjustment of the X-ray tube supportarm rotational axis

The rotational axis has been aligned during manufacture. If the alignment is not correct after assembly please align.

Remark:
Loosen both lower fastening screws (Fig. 43/Pos. 1) and both security screws (Fig. 43/ Pos. 2). Perform adjustment with both adjustment screws (Fig. 43/Pos. 3) and the shortened 4 mm socket head cap key. Fasten afterwards the fastening screws and security screws.

3.4 Adjustment of the rotation detent (0°, 90 °)

The rotational axis has been aligned during manufacture. If the alignment is not correct after assembly please align.
Please follow chapter 3.9 first and activate Program 6.
Adjust the 0° position of the tube while loosen the rotation brake. Loosen the threaded pin (Fig 44/Pos 1), rotate the washer (Fig 44/Pos 1) until the yellow SID on the control board lights up and tighten the threaded pin afterwards. Save the value on control panel.

3.5 Adjustment of the table Bucky in the transverse direction

Loosen the screws (Fig. 45/ Pos. 1) from the four fastening strips. Adjust the Bucky transversely and fasten afterwards the four screws again.

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Fig. 45

Fig. 46

3.6 Adjustment of the vertical SID switch

SID switch has been pre-aligned in the factory:
Distance between table top - control arm lower side: **985 mm (SID 1,15 m)** standard value
851 mm (SID 40“) USA version

Remark:
The film object distance is considered with 7,0 cm and the focus rotation axis distance is considered with 20 mm. After installation of tube, collimator and Bucky consider the deviated values and adjust the desired SID.
Adjust the correct SID:
Loosen and displace the trip cam (Fig. 46/Pos. 1) with both screws (Pos. 2) so that the micro switch in the vertical carriage will be activated. If necessary transpose the rail by one hole division. Tighten all screws again.

3.7 Exposure Height Adjustment Nominal value: table height 750 mm

To adjust exposure height, remove covers (Fig. 1/Pos. 2) and (Fig. 1/Pos. 5).
Drive to the focused exposure position, then drive to the desired exposure position.

Change setting value on trimmer -R4: cw = upwards, ccw = downwards.
LED -V14 is showing the reached exposure position.
The nominal value can be measured on -X16:9; approx. 8,6 V
Drive several times to exposure height and control exposure position; readjust if necessary.
The different exposure height when driving upwards resp. downwards can be balanced on trimmer -R5. Switch on the unit and perform functional tests as described in 4.2

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3.8 Table height control electronics

Adjust height potentiometer -R1 so that a reserve of 1/2 turn of the potentiometer in the top and in the bottom position remain.

Table adjustment max. at the top: max. table height 850 mm

Drive the table to the top and stop just before reaching the safety limit switch -S4.
Adjust with trimmer -R2 when LED V12 is just starting to give light.
Drive to top end position several times and correct - if necessary - on trimmer -R2 . (cw = upwards, ccw = downwards).
The nominal value can be measured on -X16:7; approx. 11V.

Table adjustment max. at the bottom: min. table height 850 mm

Drive the table to the bottom and stop just before reaching the safety switch limit switch -S4.
Adjust with trimmer -R6 when LED V16 is just starting to give light.
Drive to bottom end position several times and correct - if necessary - on trimmer -R6 .
(cw = upwards, ccw = downwards).
The nominal value can be measured on -X16:11; approx. 1,65V.

Exposure height: nominal value 750 mm

Drive to the focused exposure position, then drive to the desired exposure position.
Change setting value on trimmer -R4: cw = upwards resp. Ccw = downwards.
LED -V14 is showing the reached exposure position.
The nominal value can be measured on -X19:9; drive to approx. 8,6 V exposure height several times and control exposure position; readjust if necessary.
The different exposure height when driving upwards resp. downwards can be balanced on trimmer -R5.
The nominal value can be measured on -X19:10; approx. 0,18V

Slow motion range adjustment

Speed range for slow motion movement can be adjusted on trimmer -R7, both for up and down as well as for exposure height. cw = increase of range; ccw = reduction of range. -V17s illuminated during slow motion movement.
Test Point: -X16:12 ; approx. 0,55 V

Slow motion time adjustment

Movement starts with slow motion speed; after the preset period of time movement turns to quick motion. Time can be adjusted on Trimmer -R8. cw = longer period of time ccw = shorter period of time Slow motion period is shown on LED -V18.
Test point: -X16:13; approx. 0,5 sec.

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3.9 Adjustment of control parameters

The control is equipped with an installation function to be able to put in the equipment the customer's relevant parameters.
Therefore a jumper (Fig. 47/Pos.1) on the interface board has to be changed; the tomo control is now in starting mode and the control panel will show „installation".
Choose now with the push buttons for tomo height (and) the starting Program (no. 1 until 36) and activate with the test button (visible with * at the end of the upper display).

Amend values in the active Program respectively activate movements with the push buttons for tomo height. Save afterwards amended values respectively positions with the PREP-switch or leave the Program without saving with the table switch.

Choose now with push buttons for tomo height the next Program and proceed as before. After conclusion of the settings, change jumper (Fig. 47/Pos. 1), the equipment is in tablemode.

The control panel in the installation mode is equipped with an amended keyboard function. Use the included paper guide.

- when pushing plus respectively minus key all programmes will be listed (separate or fast run)
- the test key activates the desired Program (will be shown with the symbol * on the end of the upper display line)
- with the plus respectively minus key values can be integrated amended or movement of the single axis can be performed
- with the PREP-switch the shown condition will be saved
-
- with the table switch the Program can be left without saving.

Remark:
For easy handling of the first operation and for an emergency the control software of each Programs equipped with a basic set-up. Can be reactivated later while activating the Program 36 and saving afterwards. All before amended parameters will be deleted.

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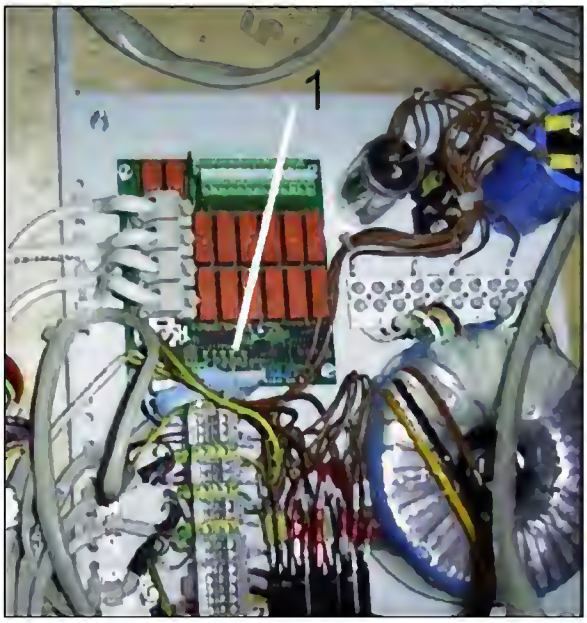

Fig. 47

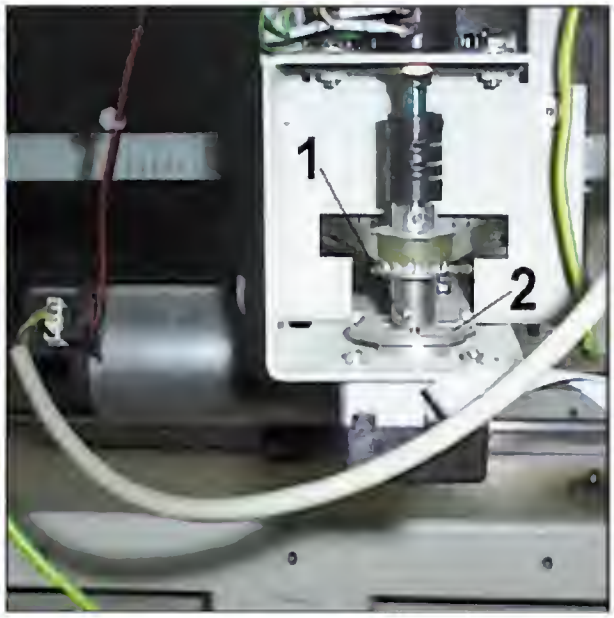

Fig. 48

3.10 Centring of Bucky in table transverse direction

First please follow chapter 3.9, activate Program 13 or drive with the PREP-switch to zero position in the tomo operation method. Check the centring of the film to tube middle with the light and for deviations activate Program 5. Move the Bucky manually to middle centring. Loosen threaded pin on Bucky drive. Rotate the regulating washer (Pos.) until the yellow SID lights up on the control board. Retighten the threaded pin (Pos.). Save value on control panel.

Remark:
If the middle will be changed more than 5 mm, amend also the end positions (Program 9+10).

3.10 Adjustment of the basic set-up, zero points (index) and software end switch

Program 1	language
Standard: german	USA version: change to english
Pro	
Program 2	unit of measure
Standard: cm	USA version: change to inch

Program 3	**Listing**
Standard:	Bucky wall stand left

If the longer travel range of the tube stand is placed on the right side, adjust right.

Attention:
If the Bucky Wall stand has been mounted on the right side, amend the values of the programmes 4, 7 and 8, 16 and 18 (A-/B- position) (index and software end switch tube stand).

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Program 4 index column

Position tube stand on one limit stop, loosen clamp screws of spiral coupling, adjust the potentiometer (=AC-R1) ¼ to ½ rotations for limit stop. Retighten clamp screws of spiral coupling. Position the tube stand to the middle of the table (700 mm from limit stop on the short side of the rail stand).

Activate Program; loosen the clamp screw on the incremental transmitter (=AC-U1) and twist the adjusting washer on the incremental transmitter until yellow SID on the board lights up. Then tighten one of the clamp screws on the axis. Save value on the control panel.

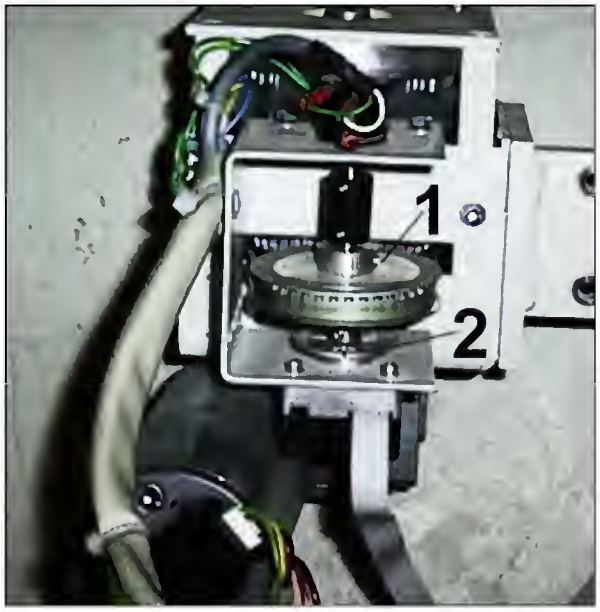

Fig. 49

Fig. 50

Program 6 index tube

Remark:

The tube stand has to be aligned vertical with an liquid level. Then activate Program; loosen clamp screws on gear belt wheel of the travel range (potentiometer has to be preset).

Adjust the tube rotation to 0° (light).

Rotate the adjusting washer on incremental transmitter (=AC-U2) until yellow SID on the board lights up. Then tighten one of the clamp screws on the axis. Save value on the control panel.

Program 5 index Bucky

Remark:

First align supporting arm (horizontal) and catch of the column rotation. Position Bucky carriage on one limit stop side, loosen clamp screws of the spiral coupling adjust the potentiometer (=AC-R3) ¼ to ½ rotations for limit stop. Retighten clamp screws.

Center Bucky carriage (film middle) to tube stand (laser or light) and activate Program. Loosen clamp screws on the incremental transmitter (=AC-U3) and twist the adjusting washer on the incremental transmitter until yellow SID on the board lights up.. Then tighten one of the clamp screws on the axis. Save value on the control panel.

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Program 7/8 software-limit stop (ES) tube stand right / left
Activate Program.
Move column to left and right limit stop or drive by motor with the push buttons for tomo height (and) .
The travelled range from the zero position will be shown on the control panel - limit stop by approx. 940 mm / 700 mm. Move tube stand approx. 30 mm from limit stop and save values on control panel.

Program 9/10 software- limit stop (ES) Bucky right / left
Activate Program.
Move Bucky carriage to left and right limit stop or drive by motor with the push buttons for tomo height (and).
The travelled range from the zero position will be shown on the control panel. Move Bucky carriage 10 mm from limit stop and save values on control panel.

Program 11/12 software-limit stop (ES) tube right / left
standard set-up from +115° / -115° has not be changed.

Program 13 drive to index
When actuating a push button for tomo height (and) all axis drive to the before adjusted index (zero position) after activating the Program. This Program is just for the control purposes and has not to be followed.

Adjustment for wall mode and safety range

Program 15/17 SID Bucky Wall Stand A / B
is for the input on the display shown horizontal SID values

Adjustment:	115 cm	180 cm	(standard)
	40 inch	72 inch	(USA version)

Remark: If there is no Bucky Wall Stand set all values on zero.

Program 16 / 18 A-/B-Position
The column position will be shown in mm (starting on zero position) after activating the Program.

Adjustment:	A = -900 mm (+900 mm for right hand version)
	B = -250 mm (+250 mm for right hand version)
	B = - 87 mm for USA version (+87 mm for right hand version)

Note: Move column to the corresponding end position or drive motor-driven by using the push button for tomo height (and). Save value on control panel.

Remark: If there is no Bucky Wall Stand set all values on zero.

If necessary correct the adjustments of the programmes 15 until 18 while installing the equipment according to the real position of the Bucky Wall Stand.

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Program 19 correction range tube stand
The extent of range for A-/B-position where the tube stand brake will be activated when moving manually can be adjusted between □1 mm and □ 30 mm. The basic set-up □5 has not to be amended during installation.

Program 22 Dead time generator
The dead time of the generator can be adjusted from 0-200 mm in 10 mm steps. Determine the dead time from the generator data. Adjust time on control panel and save afterwards.

Program 20 correction range tube
The size of range for 0° - and 90° -position where the correction function works (motor-driven positioning will be shown through flashing of SID on control arm). The basic set-up □5
has not to be amended during installation.

Adjustment of the equipment specific dimensions

Program 24 film-object-distance
The film-object-distance can be adjusted depending on the used Bucky from 5,0 cm until 10,0 cm. The basic set-up of 7,0 cm has to be amended during installation. Measure the distance from the table top to the cassette tray. Then deduct 1,1 cm from the determined measure because of position of film in cassette. Adjust the result figure on control panel and save.

Program 25 film-focus-distance
The desired vertical SID can be put in from range 100 cm until 115 cm respectively 38 inch until 45 inch. After installation of tube and collimator (center of gravity) as well as Bucky the SID-switch in the column has to be adjusted to this value and glue the included tomo bench mark.
Basic set-up 115 cm (standard) respectively 40 inch (USA-version).

Program 26 table top-rotation-distance
can be adjusted from 85,0 cm until 112,0 (rotation = rotation axis of supporting arm)
Adjustment: 106,0 cm standard respectively 92,6 cm (USA version) has to be measured during installation corresponding to correct adjustment of SID and to be corrected.

Remark: The correct adjustment of the SID on the equipment and the exact input of the values in Program 24 and 26 determines the exactness of the fulcrum height during tomo exposure!

Control system and tomography-exposure time

Program 23 Exposure control
Choose between angle controlled (radiation release switched-off during tomo exposure with the tomo control) and time controlled (radiation release switched-off with generator).

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Program 27 - 34 exposure time tomography
two exposure times of each Tomographic angle can be chosen in steps of 0,1 s within the marked range:
8° 0,4 s to 1,2 s
20° 0,6 s to 3,0 s
30° 1,0 s to 4,0 s
40° 1,5 s to 4,0 s

Basic set-up (biggest and smallest time of each angle) has to be amended during installation to generator.

The adjusted values shall be recorded in the file „customers setting" of the parameter index (see enclosure). This index is included to the mounting instructions and supplied to the customer.

Installation-Program 1 to 36

no.	designation	selection possibility	default parameter	customers setting
1	language	german / english	USA english	
2	unit of measure	cm / inch	USA inch	
3	installation	left / right	left	
4	index column	set	*	
5	index Bucky	set	*	
6	index tube-rotation	set	*	
7	end position column right	drive	+670 mm	
8	end position column left	drive	-670 mm	
9	end position Bucky right	drive	+220 mm	
10	end position Bucky left	drive	-305 mm	
11	end position tube rot. ccw	drive	+115 Grad	
12	end position tube rot. cw	drive	-115 Grad	

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13	----			
14	----			
15	SID wall stand A	90-204cm / 35-80“	115 cm / 40“	
16	A-position	drive	-900 mm (+900)	
17	SID wall stand B	90-204cm / 35-80“	180 cm / 72“	
18	B-Position	drive	-250 mm (+250) -87 mm (+87)	
19	capture range column	±1-±30 mm	± 5 mm	
20	rotational index range	±1-±10 Grad	±5 Grad	
22	delay-time x-ray	0- 200 ms Step 10 ms	0 ms	
23	exposure timing	by generator / by tomo	USA by generator	
24	object-film-distance	5,0-10,0cm	7,0 cm	
25	SID vertical	100-115cm / 38-45“	110 cm USA 40“	
26	table top-pivot distance	85,0-112,0 cm	106,0 cm USA 92,6	
27	exposure time 1 / 8 degr.	0,4 - 1,2 s	0,4 s	
28	exposure time 2 / 8 degr.	0,4 - 1,2 s	1,2 s	
29	exposure time 1 / 20 degr.	0,6 - 3,0 s	0,6 s	
30	exposure time 2 / 20 degr.	0,6 - 3,0 s	3,0 s	
31	exposure time 1 / 30 degr.	1,0 - 4,0 s	1,0 s	
32	exposure time 2 / 30 degr.	1,0 - 4,0 s	4,0 s	
33	exposure time 1 / 40 degr.	1,5 -4,0 s	1,5 s	
34	exposure time 2 / 40 degr.	1,5 - 4,0 s	4,0 s	
36	set default parameter	reset	-------	---------

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*** The zero positions of the axis are adjusted so that:**

- the tube stand is positioned to table center
- the zentralray of the tube is vertical
- the Bucky middle to the tube is centred

NOTE:

The indicated and saved analog valve on the control panel varies depending on the mechanical basic set-up. This will not influence the exact centring of the axis. It is decisive that the mechanical axis position corresponds with the index of the incremental transmitter.

Attention!

If the zero positions (programme 4 and 5) will be amended more than 5mm afterwards for example during installation, the software end positions (programme 7 to 10) have been amended too.

3.10 Error advise

The control is in the position to recognise certain error conditions and to react accordingly. If one of the below mentioned error will be recognised, the upper display line will show failure E -xx" with the corresponding error code. The lower display line will show „Reset equipment!" respectively „call service"! in case that the error occurred during initialisation / drive to index.

Error E-XX
reset unit!

Error E-XX
call service!

Additionally the control shuts off all operation and a supplementary produced NOT-STOP signal shuts off all motors.

<u>Implemented error codes</u>

E -37 Motor side towing distance exceeding of the column
E -38 Motor side towing distance exceeding of the Bucky
E -39 Motor side towing distance exceeding of the tube rotation
E -52 Power take-off side towing distance exceeding of the column
E -53 Power take-off side towing distance exceeding of the Bucky
E -54 Power take-off side towing distance exceeding of the tube rotation

These error codes will be produced in case that the deposit towing distance has been exceeded in the starting programme.

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E -60 Error in EPROM (parameter saving)
The adjusted parameter are packed in one EPROM. For safety reason there are two separate save blocks with check total control available. If both save blocks are defective during initialisation, this error will occur.

E -61 Error in data travel of the Token ring
The control part controls permanently the data travel of the Token ring. In case of error (brake of connection, defect of motion controller, adulterated telegrams), this error message will occur.

Remove of error:

In case of error message switch-off equipment and try again to switch-on after approx. 3 minutes. If the error message is still visible check all connections from **E -37 until E -54** from and to the potentiometers, also to the incremental remitter as well as the potentiometer and the incremental remitter.

For **E -60** set the jumper on starting. Switch-on equipment while pushing angle and A-switch. Setting-ups from the factory will be loaded. Switch-off equipment, switch-on again after some time, proceed starting. Set back starting-jumper, Parameters will be saved.

For **E -61** check all data connections as well as the motion controllers

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4. TECHNICAL MAINTENANCE

4.1 Mechanical and Electrical Tests

NOTE:
The maintenance schedule described below shall be done at 12- month intervals.
If functional tests during maintenance require power, disconnect the power as soon as the part has reached the new position, or after the appropriate functional test sequence.
Defective parts must be replaced by genuine spare parts according to spare part lists enclosed.
Use only non-acid grease for maintenance. Do not grease or oil ball bearings with sealing washers.

Preliminary work: Check column of damages or missing parts.
Check all cables upon damage especially on the fastening points.
If necessary replace or repair the defective components.
Check electrical cable loop of sufficient length.
Check all covers. If necessary replace damaged parts.
Check range of equipment movements on blocked objects. When collision danger apparent, inform the user of all risks.

Tools: Usual assembly tools, standing ladder, torque balance key, liquid level, spring balance, feeler, cleansing agent, grease.

Preparations: Switch off equipment
Dismount bumper and stop (Fig.61/Pos. 1+2) at either end of the table top from profile rail (lateral).

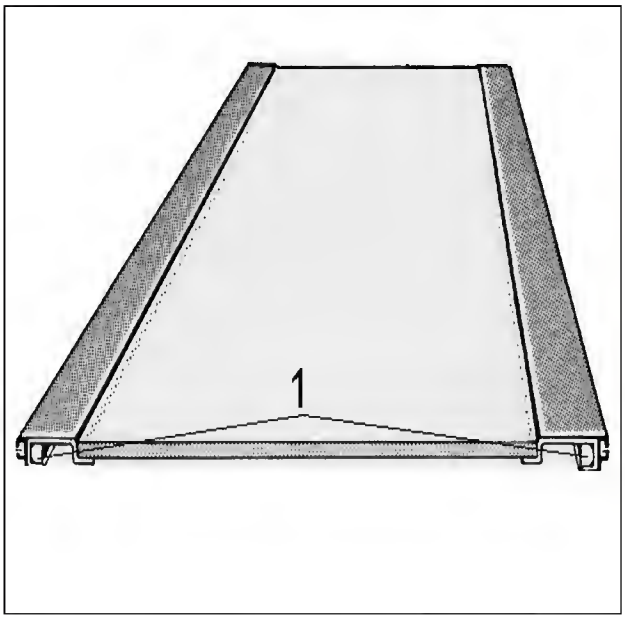

Fig. 61

Fig. 62

Take out table top and lay aside securely.

Dismount front cover (Fig. 16/Pos. 1+2)
Remove cover left and right (Fig. 64/Pos. 1).

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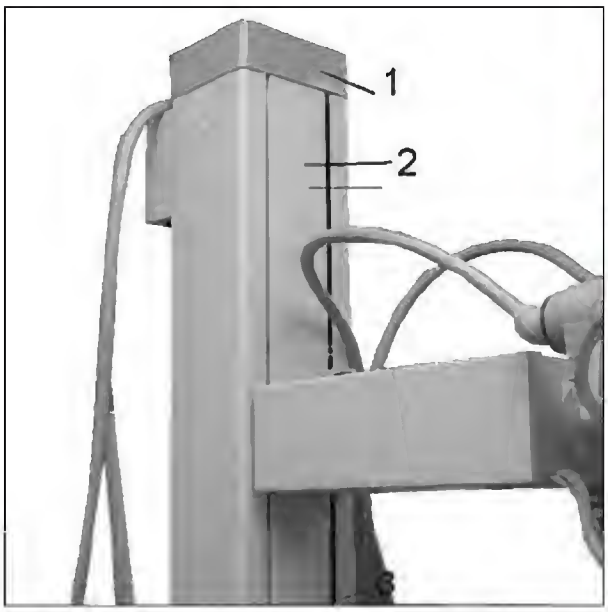

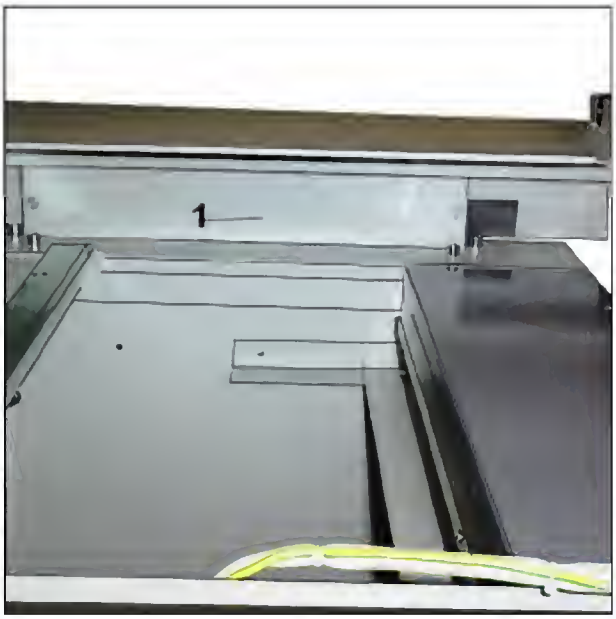

Fig. 63

Fig. 64

Floor mounting: Check firmness of anchor bolts. Tighten, if loose, at a torque of 50 Nm (5 mkp).

Bucky: Check on smooth running over total travel range. Running noise ?
Determine defective bearings. Replace if necessary.
Clean guide rail and bearings and oil lightly.
Check and if necessary adjust eccentric bearing (Fig. 65/Pos. 1).
Correct adjustment: The bearings can still be rotated by hand.
Check bumpers (Fig. 65/Pos. 2) on firmness and damage.
Switch-on equipment. Check brake (Fig. 65/Pos. 3) and adjust if necessary.

Table frame: Clean left and right guide shafts (Fig. 66/Pos. 1) and grease lightly.
Switch-on equipment. Check performance brakes (Fig. 66/Pos. 2).
Adjust if necessary.
Check bumpers on both sides (Fig. 66/Pos. 4) on firmness and damage.
Remount the caps (Fig. 64/Pos. 1) on the left and right side.

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Fig. 65

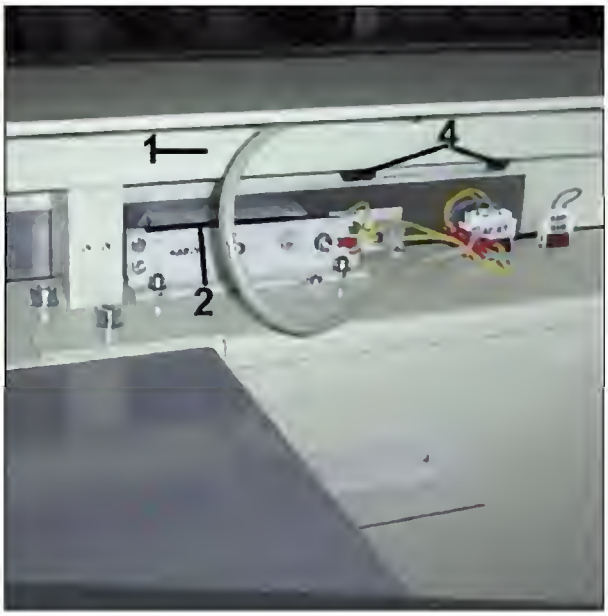

Fig. 66

Table top:

Check plastic rollers (Fig. 67/Pos. 5) for trace of wear. Replace and oil if necessary.
Clean and check all ball bearings for table top movements to assure smooth motion.
Replace and grease if necessary.
Clean guide profiles of the table top.
Insert table top. Move over total travel range. Running noise? Smooth running? Adjust bearings with eccentric (Fig. 67/Pos. 6) if necessary.
Switch-on equipment. Check performance of brake (Fig. 67/Pos. 7). Replace brake magnet if necessary.

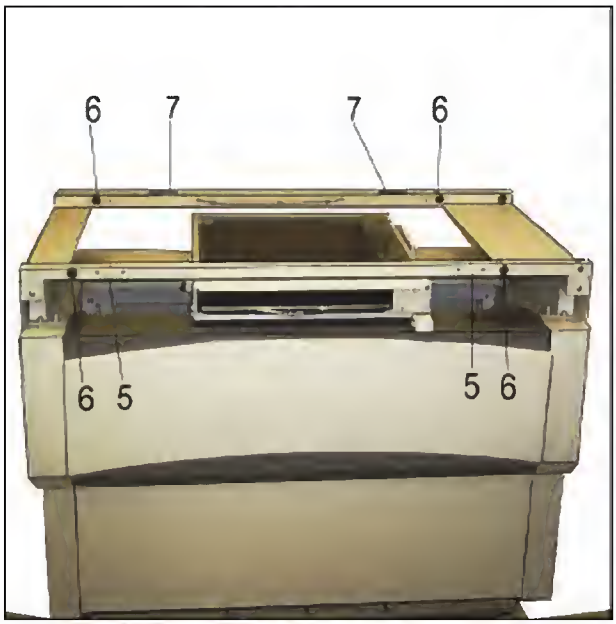

Fig. 67

Fig. 68

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Remount bumper and stop (Fig 61/Pos. 1+2) at either end of the table top to profile rail sides.

Lift motor: Check chain and sprocket wheels (Fig. 68/Pos. 15) for trace and wear.
Perform a test run if necessary.
Check chain tension. It should be taut. Adjust if necessary.
Note: Loosen counter nut (Fig. 69/Pos. 18). Release screws (Pos. 19).
Adjust chain with clamping stud (Pos. 20). Counter clamping stud.
Tighten screws (Pos. 19)
Check all motor suspension bolts on firm seating.

Fig. 69

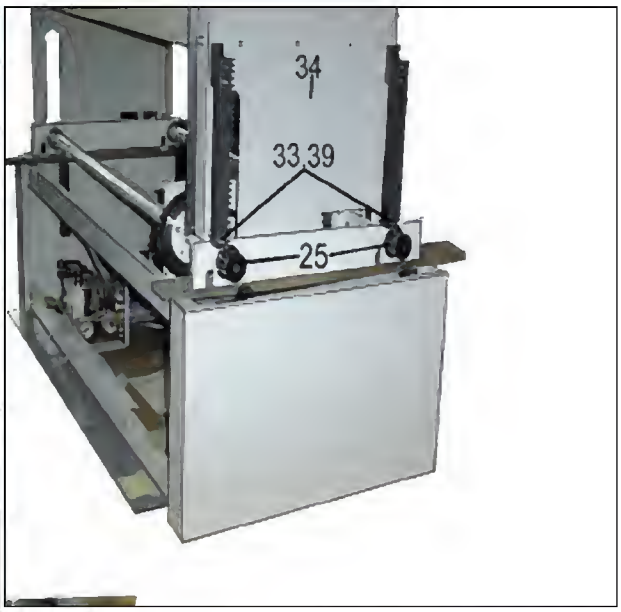

Fig. 70

Toothed Racks, Drive Shafts, Pinions:

Switch on the unit. Run through entire travel range several times.
Listen for hard knocking noises. Switch-off the unit. Check the 8 racks (Fig. 70/Pos. 25) and 4 pinions for wear. Use a mirror for visual checking.
Any hard knocking running noise or visible damage ?
If not, reggaes toothed racks and all bearings. Continue with maintenance for the Bucky carriage.

If there are knocking noises or mechanical damage:
Remove left plugs and right plugs.
Remove 4 ISK each on either side (Fig. 71/Pos. 28).
Lift off table frame (Fig. 71/Pos. 29).
Remove plug (bottom of Bucky carriage) (wall side).

Remove plug on component board.
Remove cable strain relieve.
Lift off outer jacket (Fig. 69/Pos. 32) by pulling upward uniformly. Do not use force !
Caution: The Bucky carriage is not locked !
Remove 4 screws (Fig. 70/Pos. 33) and bushings.

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Crank up jacket support (Fig. 70/Pos. 34) all the way up and lift it off with drive assembly (Fig. 69/Pos. 36). Arrange wooden bars (Fig. 22). Place support / drive assembly on bars.
Continue drive until the crank up jacket can be removed from drive assembly.
Toothed racks, pinions and drive are now fully accessible. Replace defective parts.

Note:

Before removing the chain or the sprocket wheels, insert the index pins (Fig. 69/Pos. 24) into drilled holes (Fig. 69/Pos. 24) on motor support and sprocket wheel flange.

Do not forget to remove the index pins afterwards.

Reassemble:

Place the jacket support (Fig. 70/Pos. 34) with toothed racks onto the pinions.
Crank in the jacket support until a measure of □ 12 mm (Fig. 26, detail) is reached.
Attach complete support/drive assembly to toothed racks of table base frame (Fig. 23).
Crank in assembly approx. 10 cm. Insert 4 bushings (Fig. 72/Pos. 39) and fasten 4 screws (Fig. 70/Pos. 33).

Component board:

Disconnect power (fuse).
Check with voltmeter that power is really off !
Tighten set screws of all wire connections.
Check all components on firm seating. Tighten screws of necessary.

Note:

For better access the component board (Fig. 72/Pos. 30) together with the foot switches (Pos. 48) can be pulled out.
For this, loosen 2 screws (Fig. 72/Pos. 43). Pull out forward (arrow) complete component group.

Fig. 71

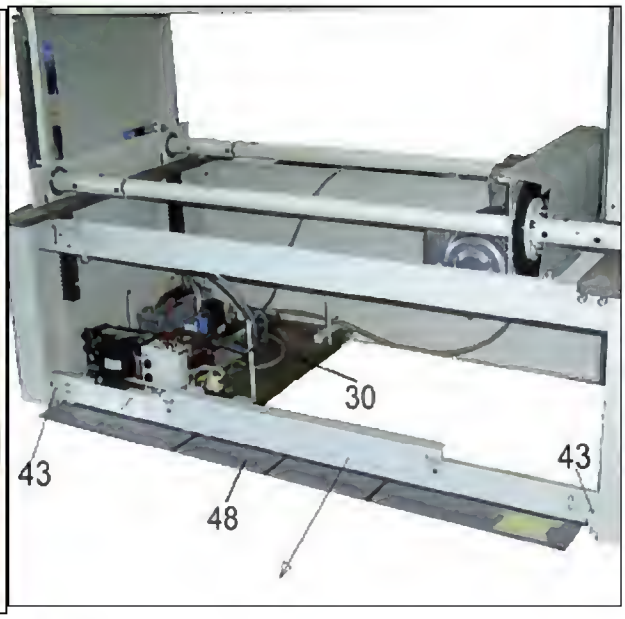

Fig. 72

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Vertical carriage: Clean guide rail of the column and runners of the vertical carriage. Check on damage and grease lightly. Check on smooth running over entire travel range. Running noise ?
Determine defective bearing. Replace if necessary.
Check performance of safety brake.

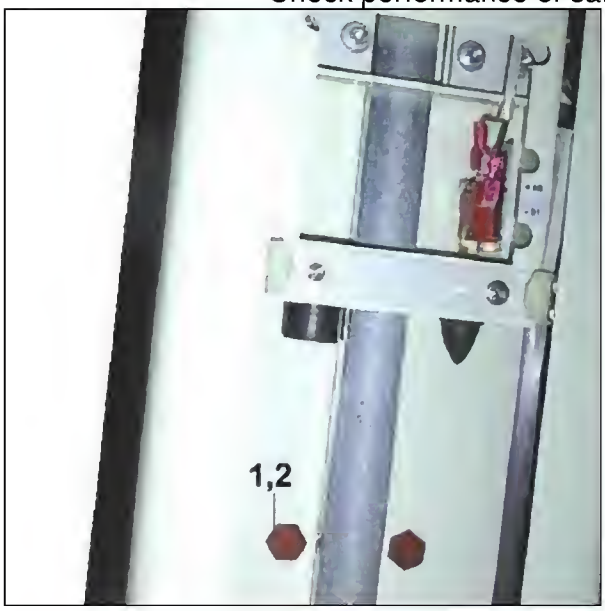

Fig. 73

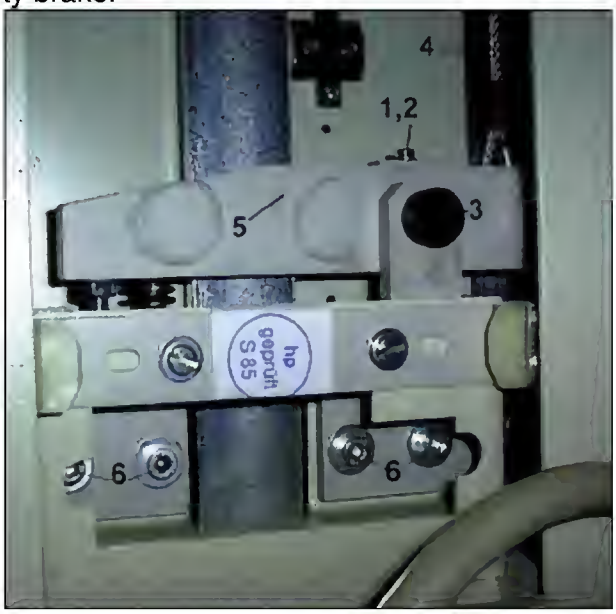

Fig. 74

Note: Drive vertical carriage fully down until the threaded bore-hole (Fig. 73/Pos. 1) of the counterbalance is coincide with bore-hole in the column. Tighten counterbalance with screws M8 (Fig. 73/Pos. 2) and corresponding washers. Lift vertical carriage some cm and release only if vertical carriage is suspended to the safety brake. Lift vertical carriage again, pull through safety brake, loosen on rope (Fig. 74/Pos. 4) to the head side. Release slowly vertical carriage. Dismount screws (Fig. 74/Pos. 2).

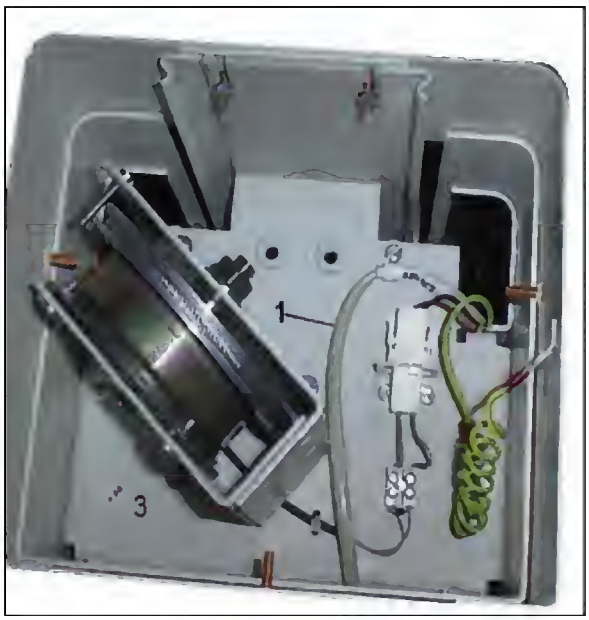

Fig. 75

Fig. 76

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Clean steel rope (do not use fat solvents) and check for damage with cotton waste. Check on smooth running over entire travel range. At the slightest sign of damage - Remove the Equipment for use until the defective cable has been replaced - inform the user directly. Further use of the equipment could endanger the security of patient and user. Do not use the equipment until the defective rope has been replaced.

Attention: **The exchange of the rope has to be done at least every 3 years**

Note:
Drive vertical carriage fully down until the threaded bore-hole (Fig. 73/Pos. 1) of the counterbalance is coincide with bore-hole in the column. Tighten counterbalance with screws M8 (Fig. 73/Pos. 2) and corresponding washers.
Lift vertical carriage approx. 30 cm and release only if vertical carriage is suspended to the safety brake. Lift head part (Fig. 75/Pos. 1) to the top and tighten with a cord to the column.
Dismount steel rope on counterbalance (Fig. 76/Pos. 3) after careful removal of the security washers (Fig. 76/Pos. 3) and bolts (Pos. 4).
Support vertical carriage with the wooden lath. Remove screws (Fig. 74/Pos. 1) and security plate (Pos. 2).
Release the lever of the safety brake (Fig. 4) in direction of the compression spring and pull out to the front the bolt (Pos. 3).
Release rope from the safety brake. Remove from the head part the safety ring with safety nippers and dismount rope after removal of both security screws (Fig. 77/Pos. 1).
Insert new rope in the head part and fasten to safety brake and counterbalance. Insert again the head part, pay attention to correct fitting.
Remount lever of the safety brake to vertical carriage.
Lift again the vertical carriage slightly while pulling through safety brake of the rope to the frontal side respectively releasing while pushing the safety brake against the compression spring. Then let off vertical carriage slowly. Dismount screws (Fig. 73/Pos. 2).
Check bearing play of the runners.

Note:
Put a paper strip (thickness of 0,1 mm) between guide surface and opposite bearing. If necessary press the opposite bearing with a screw turner after removal of the screw (Fig. 59/Pos. 1) and tighten the screw again.

Remark:
The opposite bearings must be rotatable by hand over the entire travel range.

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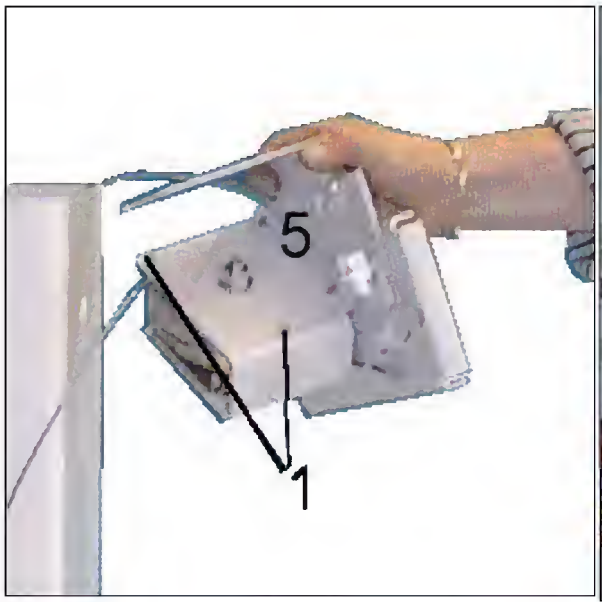

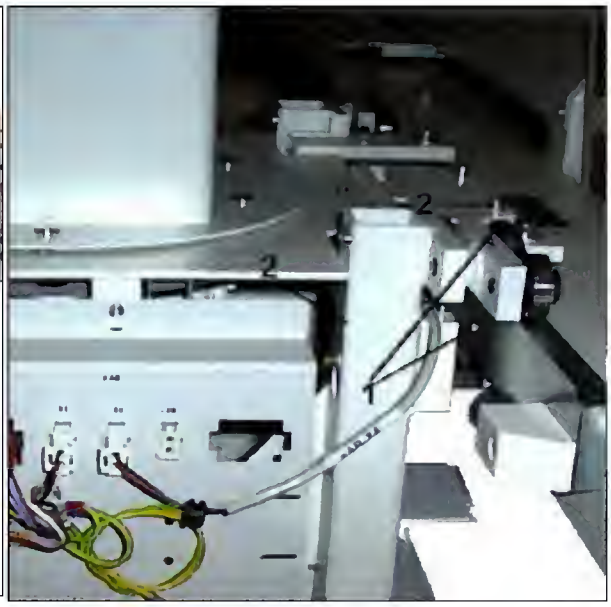

Fig. 77 Fig. 78

Vertical brake:

Remove abrasion of the magnet brake (Fig. 75/Pos. 3). Check air gap of the magnetic clutch with feeler. Nominal value: 0,3 - 0,5 mm. Check brake power over the entire travel range. Should be min. 150 N. The air gap can be adjusted when adding or removing washers.

Note:

Drive vertical carriage fully down until the threaded bore-hole (Fig. 73/Pos. 1) of the counterbalance is aliquot with bore-hole in the column. Tighten counterbalance with screws M8 (Fig. 73/Pos. 2) and corresponding washers. Lift vertical carriage approx. 30 cm and release only if vertical carriage is suspended to the safety brake. Lift head part (Fig. 75/Pos. 1) to the top and tighten with a cord to the column. Dismount steel rope of the counterbalance (Fig. 76/Pos. 1) after carefully removal of the splint pin (Fig. 76/Pos. 3) and bolts (Pos. 4). Dismount steel rope after removal of both security screws (Fig. 77/Pos. 1). Dismount guide block (Pos. 5) and adjust difference with washers. Remount guide block. Insert head part, pay attention to correct fitting. Lift again the vertical carriage slightly while pulling through safety brake of the rope to the frontal side respectively releasing while pushing the safety brake against the compression spring. Then release the vertical carriage slowly. Dismount screws (Fig. 73/Pos. 2).

Column carriage:

Clean runners of column carriage. Check upon damage and grease slightly.
Check smooth running over entire travel range. Running noise ? Determine defective bearing. Replace if necessary.
Ceck tight fit of drive block and gear belt tension.
Check bearing play of the runners.

Note:

Put a paper strip (thickness of 0,1 mm) between guide surface and opposite bearing. If necessary press the opposite bearing with a screw turner after removal of the screw (Fig. 79/Pos. 1) and tighten the screw again (Fig. 78/Pos.2).

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Remark:
The opposite bearings must be rotatable by hand over the entire travel range.
Switch on equipment. Check function of brake (Fig. 79/Pos. 4). Adjust if necessary.
Note:
Loosen screws (Fig. 79/Pos. 5) and displace magnet angle until the play between brake rail and magnet is 0,2 mm. Tighten screws again.

Rail stand:

Clean upper and lower guide rail. Check on damage and grease slightly. Check end stops on damage and check fitting. Check column stand with air level over the entire travel range. Adjust variations while adding spacers under or between.

Cleaning: Dirt accumulation which are not accessible for cleaning staff must be removed during maintenance work.

Soak contrast agent with water and remove.

After completion of the maintenance work clean all dirt accumulations.

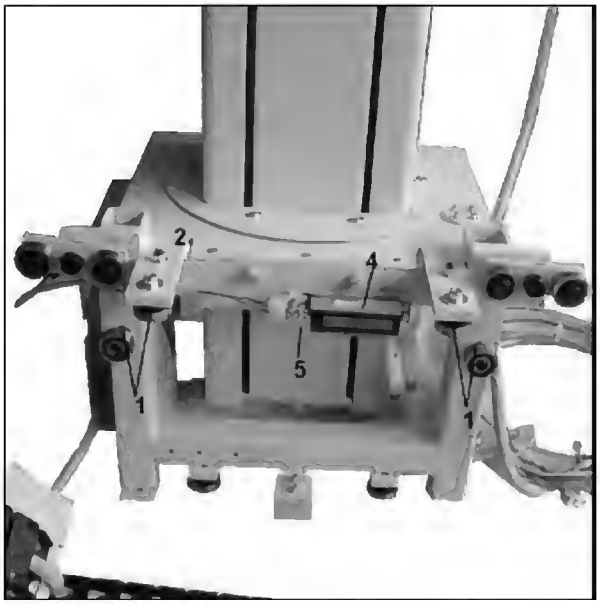

Fig. 79

Tomo Program: Check all programmes according to chapter 3.11 and adjust if necessary:

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4.2 Functional Tests

Vertical Travel Mechanism:

- Turn on unit. Check performance braising/lowering mechanism over entire travel range:
- Automatic stop in top/ bottom end positions as well as in preset exposure position?
- Smooth starting and slowing down of Foot switch?
- Accurate performance of Foot switch ?
- Accurate performance of safety switch?
- Proper spring suspension of switches?
- No brushing of outer jacket against base panelling?
- No automatic lowering at load?

Table Top:

- Check performance of floating by travelling table top over entire range both longitudinally and transversely:
- Moving smoothly? Running without noise?
- Bumper stops for longitudinal/transverse movements?
- No tendency to self-positioning?
- Accurate braking in working position?
- Accurate releasing of brake?
- Accurate performance of foot switch resp. of safety switch?
- Proper spring suspension of switches?

Bucky Carriage:

- Check performance of Bucky carriage over entire travel range.
- Moving smoothly?
- Running without noise?
- Accurate breaking in any working position?
- Accurate releasing of brake?
- Smooth cassette insertion?
- Smooth operation of cassette clamping device?
- Function of motorised centring ?

Tube stand carriage:

- Check performance of tube stand carriage over entire travel range.
- Moving smoothly?
- Running without noise?
- Accurate catching of column catch?

Vertical carriage:

- Check performance of vertical carriage over entire travel range.
- Moving smoothly?
- Running without noise?
- Accurate breaking in any working position?
- Accurate releasing of brake?
- Smooth running of robe return pulley?
- Twist-free running of robe?

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Control arm:

- Check function of SDI's
- Do they light up after the function has been fulfilled?
- Tight fitting of control arm onto support?
- Does the goniometer show the correct value?

Rotation of X-ray tube*:*

- Check performance of entire rotation range of X-ray tube
- Moving smoothly?
- Running without noise?
- Accurate breaking in any working position?
- Accurate releasing of brake?

Control panel tomo:

- is the friction in each turning position available?
- Correct switch of all push buttons?
- is the function of the emergency stop available?
- all SDI's light up during **Program** selection?

Digital display

- is the indicated value correct?
- no jumping of values visible?

Electric

- Check all connections upon damage
- Proper fitting of all plug connections?
- Accurate connection of all strain relieves?

Exposure Release:

- Drive to exposure position. Be careful to observe radiation protection measures.

- Trigger exposure.
- Exposure taken ?
- Change height to a position outside exposure position.
- Try exposure.
- No exposure?

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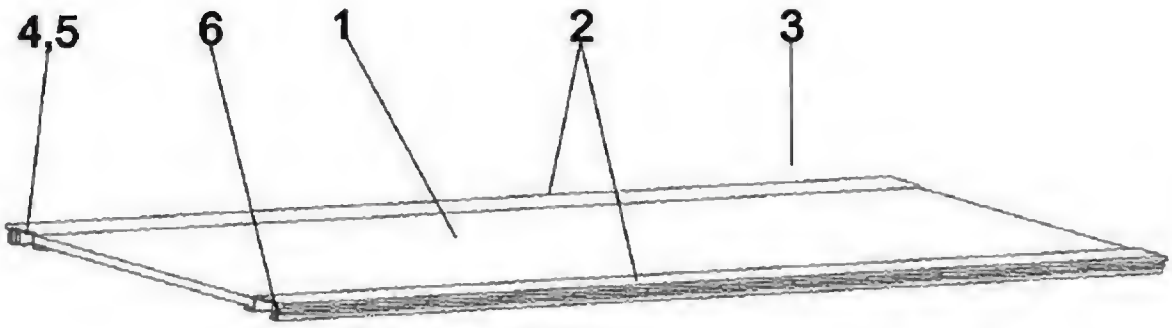
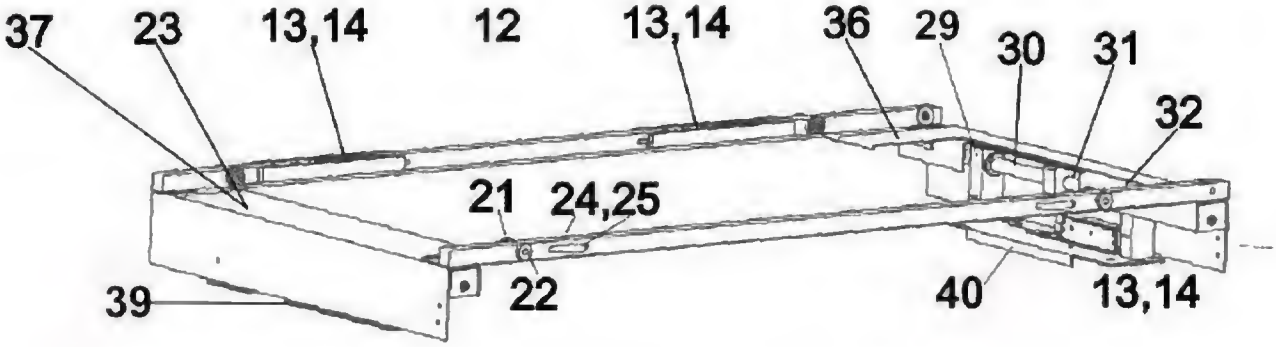
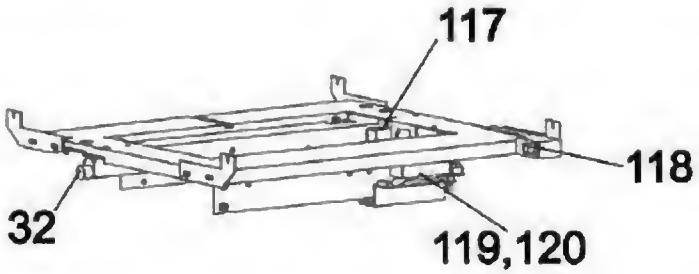
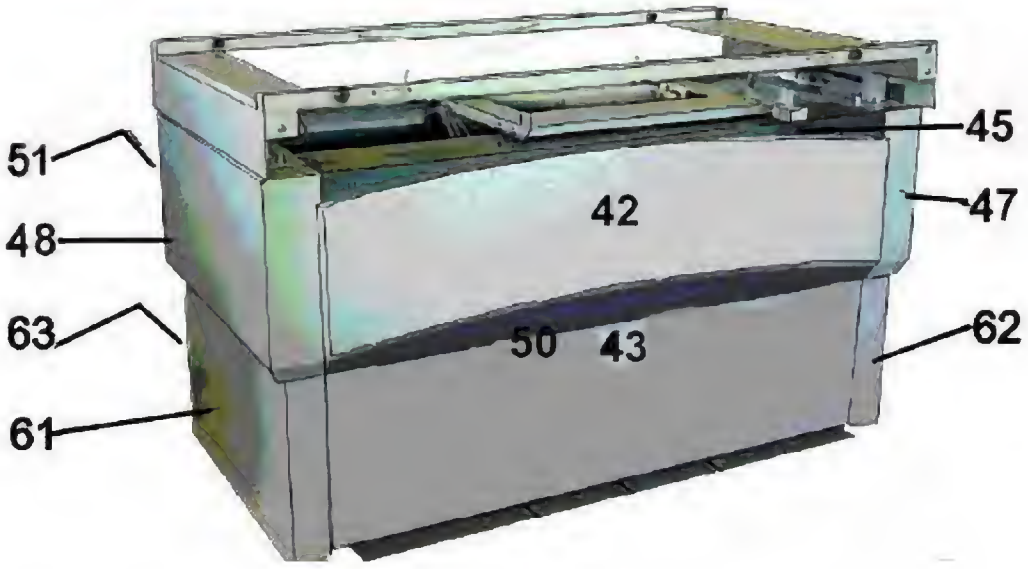
4.3.1 Spare Parts Table 1









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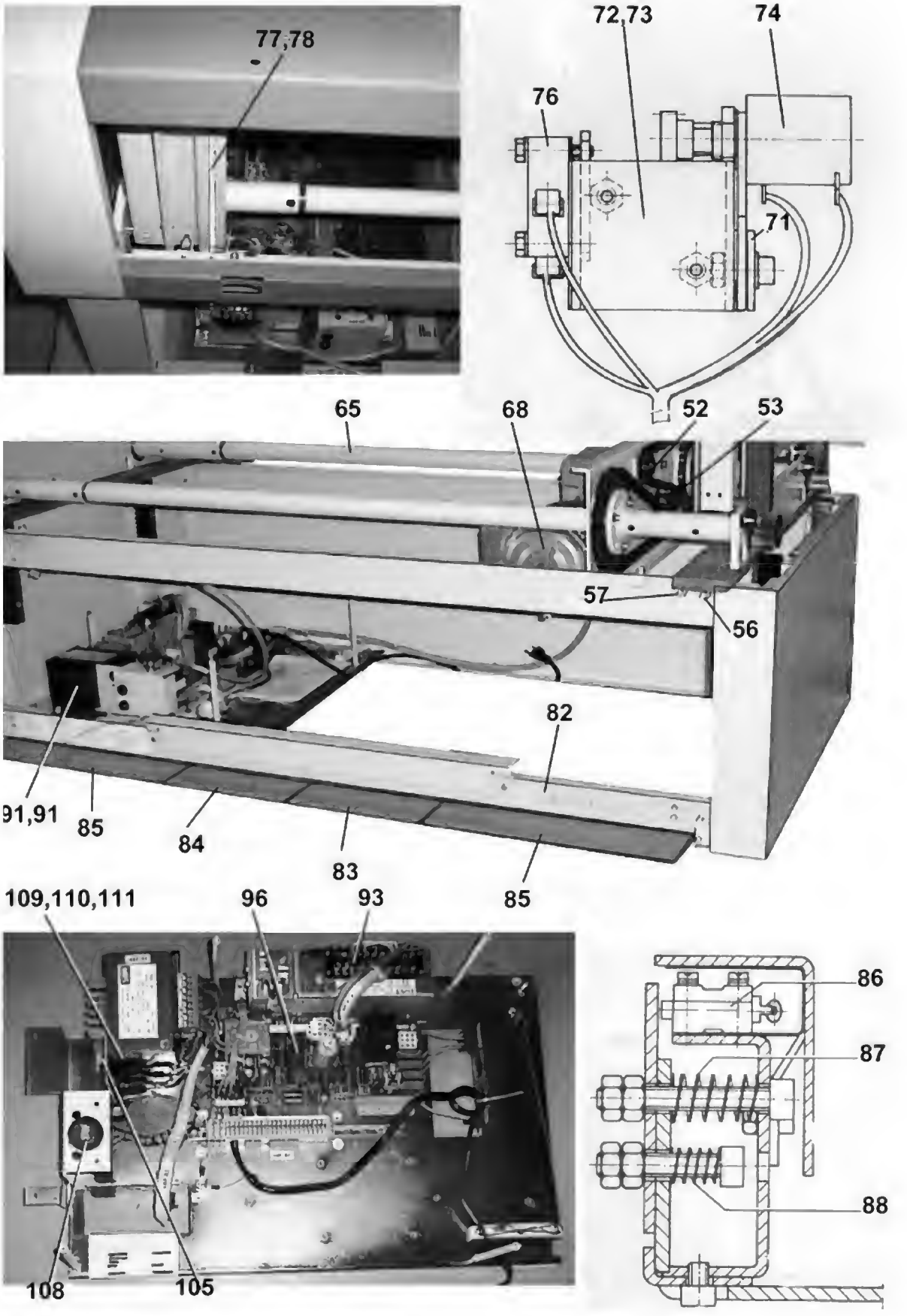
4.3.2 Spare Parts Table 2



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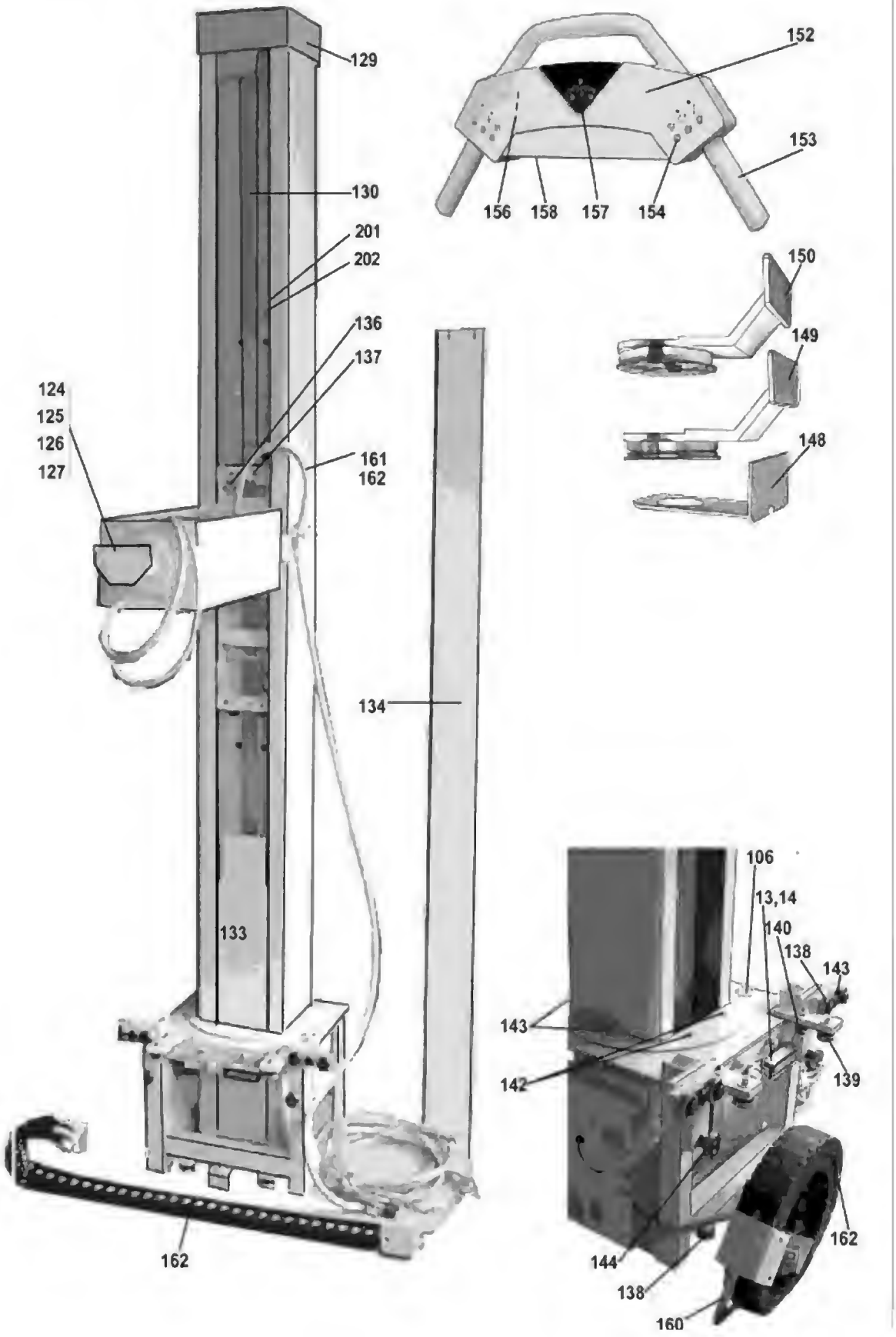
4.3.3 Spare Parts Colum 1



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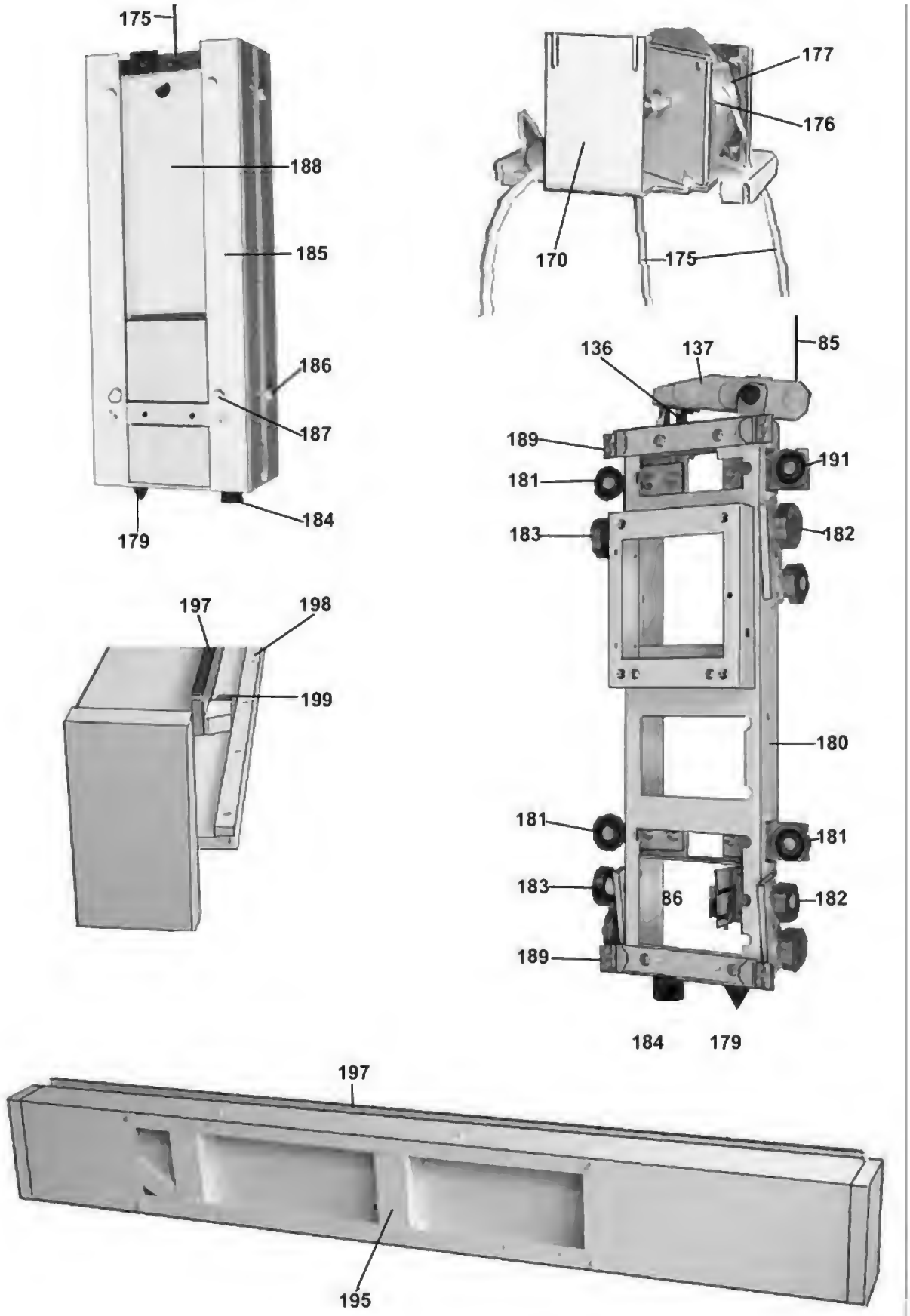
4.3.3 Spare Parts Colum 2



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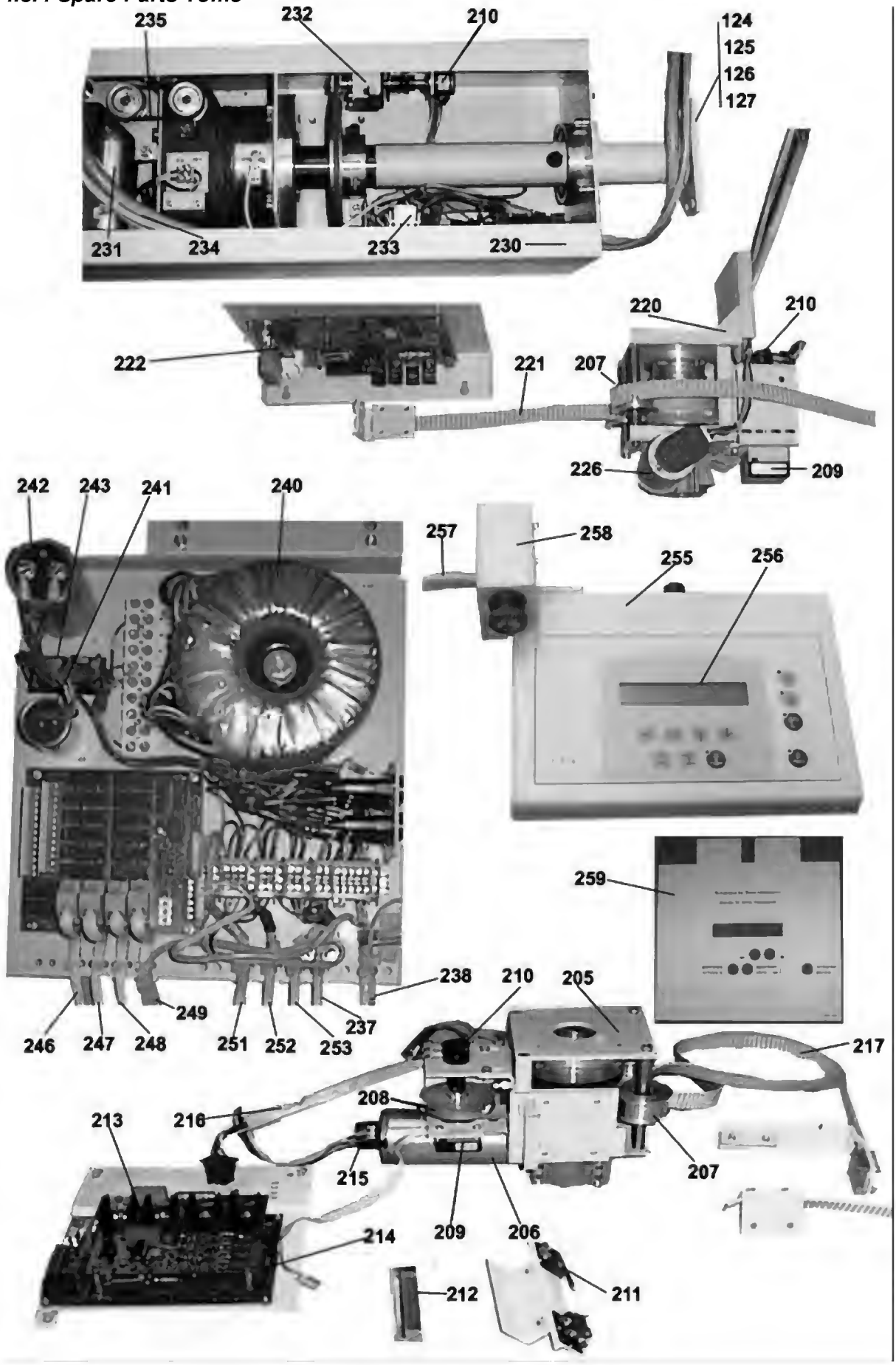
4.3.4 Spare Parts Tomo



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4.4 Spare Parts List

Description / Order No.

NOTE:

Defective parts must only be replaced by genuine spare parts as listed below. For shipment of spare parts, always specify serial number of equipment and full ordering number(s).
Parts or part assemblies may only be replaced by the manufacturer or parties expressly authorised. See also chapter on "Safety Procedures".

Pos.	Designation	Ordering No.
1	Table top	0622 0548
2	Profile rail	0622 0549
3	Frame	0622 0541
4	Stop	0622 0550a
5	Bumper	0005 0164g
6	Stop	0622 0550b
7		
8		
9		
10		
11		
12	Frame	0622 0501
13	Magnet	0006 0603
14	Spring	0622 0531
15		
16		
17		
18		
19		
20		
21	Bearing with bushing	0622 0556
22	Bearing with eccentric	0622 0555
23	Bearing with bushing	0622 0557
24	Shaft	0622 0515
25	Plastic roller	0622 0514
26		
27		
28		
29	Bearing block	0622 0085a
30	Guide shaft	0622 0528
31	Bearing Block	0622 0522b
32	Bumper	0005 0108
33	Bearing LBAR 20	0005 0191a
34	Snap ring 32x1.5 DIN 471	2200 0223
35		
36	Cover	0622 0523
37	Cover	0622 0526
38		

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Pos.	Designation	Ordering No.
39	Bridge	0627 0828a
40	Bridge	0627 0828b
41		
42	Cover panel, Front	0627 0845
43	Cover panel	0627 0839a
44		
45	Bridge, Front	0627 0834
46	Bridge, Rear	0627 0156a
47	Outer Side Panel	0627 0830a
48	Outer Side Panel	0627 0830b
49		
50	Bidge, Front	0627 0835
51	Cover, rear	0627 0836
52	Track-connecting tool	0627 1244
53	Chain	2300 0027
54		
55		
56	Bearing with eccentric Bushing	0627 0119
57	Bushing	0627 0140
58	Cable Protection Cover	0627 1265
59		
60		
61	Side cheek	0627 1155a
62	Side cheek	0627 1155b
63	Back cover	0627 1152
64		
65	Toothed Rack Drive II	0627 1200
66		
67		
68	Drive Motor (230 V) comp.	0627 1205
69		
70		
71	Terminal	0627 1334
72	Height Test Unit	0627 1130
73	Holder for Potentiometer	0627 1133
74	Potentiometer, cpl.	0627 1136
75		
76	Switch with Roll	0006 0616ba
77	Rackholder	0627 1320
78	Toothed Rack	0627 1330
79	Crank Handle	0627 1325
80	Eccentric Bushing Comp.	0627 0034
81		
82	Pedal, Comp.	0627 1140
83	Pedal, Short, "Up"	0627 1148
84	Pedal, Short, "Down"	0627 1146
85	Pedal "Brake"	0627 1144
86	Switch	0006 0079a
87	D-spring	0005 0042s
88	D-spring	0005 0042t
89		

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Pos.	Designation	Ordering No.
90	Transformer (230 V)	0627 1470
91	Transformer (115 V)	0627 1465
92		
93	Frequency Converter	0627 1461
94		
95	Component board cpl.	0627 1450
96	Relay Board	0627 1460
97		
98	Motor Relay	0006 0667
99	Relay	0006 0286b
100		
101		
102		
103		
104		
105	Push button	0006 0084a
106		
107	Cable tie	0322 0076
108	Service Switch	0006 0260
109	Fuse holder	0006 0144
110	Cap for 5x20	0006 0152a
111	Cap for 6,3x32	0006 0152b
112		
113		
114	Bearing with eccentric	0632 0653
115	Bearing with bushing	0632 0657
116		
117	Bridge plug	0632 0307
118	Brake complete	0632 0615
119	Magnet	0006 0603
120	Spring	0632 0418
121		
122		
123		
124	Tube support arm 100 mm	0125 0815a
125	Tube support arm 127 mm	0125 0815b
126	Tube support arm GE	0125 0815d
127	Tube support arm Toshiba	0125 0815e
128	Tube saddle	0125 0780
129	Head piece weld	0125 0580
130	Strip	0125 0550
131		
132		
133	Cover bottom	0370 0138
134	Cover top	0125 0570
135		
136	Spring	0005 0159
137	Safety brake II	0125 0733
138	Bearing with bolt	0125 0374
139	Bearing with eccentric	0125 0369a
140	Bearing with bushing	0125 0369b

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Pos.	Designation	Ordering No.
141	Bolt	0125 0383
142	Bearing with bolt	0125 0376
143	Bearing with eccentric	0125 0377
144	Bearing with eccentric	0125 0373
145		
146		
147		
148	Control housing	0322 0629
149	Control housing	0322 0270
150	Control housing	0322 0273
151		
152	Control handle assembly	0125 1000a
153	Handle	0125 1008
154	Button	
155		
156	Print board	0125 1020
157	Angle indicator	0125 1010
158	Table measure	0125 1019
159		
160	Cable table	0125 1607a
161	Cable column	0125 1606b
162	Timing Belt	0006 0686
163		
164		
165		
166		
167		
168		
169		
170	Column top assembly	0125 0650
171		
172	Scale cm	0008 0106
173	Scale inch	0008 0107
174		
175	Wire rope	0125 0662
176	Wire rope pulley	0125 0659
177	Solenoid bracket	0323 0555
178		
179	Parabolic spring	0005 0103a
180	Vertical carriage	0125 0701
181	Sole plate	0125 0725
182	Bearing balance	0125 0720a
183	Bearing balance	0125 0720b
184	Bumper	0005 0164h
185	Counterweight	0125 0601b
186	Glide block	0125 063
187	Glide block	0125 063
188	Weight plate	0125 0623
189	Profile	0370 0137

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Pos.	Designation	Ordering No.
190		
191		
192		
193		
194		
195	Rail assembly	0125 0115
196		
197	Rail	0125 0202
198	Floor guide rail	0125 0136
199	Stop	0125 0137
200	Switch	0006 0184
201	Wiper	0322 0131
202	Guide for wiper	0322 0130
203		
204		
205	Drive motor	0502 0120
206	Gear motor	0006 0734
207	Return pulley	0502 0128
208	Gear belt	0005 0361b
209	Incremental transmitter	0006 0718
210	Potentiometer	0006 0251a
211	Switch	0006 0184
212	Trip cam	0125 0248
213	Limit step board	0502 0470
214	Column Motion controller	0502 0460
215	Cable impulse sender	0502 0419
216	Cable drive block	0502 0406
217	Gear belt	0502 0121
218		
219		
220	Drive block comp.	0502 0220a
221	Gear belt	0502 0214b
222	Bucky Motion controller	0502 0462
223	Cable interface	0502 0417
224		
225		
226	Gear motor	0006 0733
227	Return pulley	0323 0648
228		
229		
230	Support arm mounted	0125 0802
231	Gear motor comp.	0502 0320
232	Incremental transmitter	0006 0718b
233	Tube Motion controller	0502 0461
234	Cable drive tube	0502 0407
235	Gear belt	0005 0361a
236		
237	Cable	0502 0403
238	Cable	0502 0411
239		

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Pos.	Designation	Ordering No.
240	Power supply	0006 0746
241	Capacitor 10 000 ● F	3110 0029
242	Capacitor 30 000 ● F	3110 0030
243	Rectifier	0006 0230b
244		
245	Interface board	0502 0450
246	Cable	0502 0401b
247	Cable	0502 0401a
248	Cable	0502 0401c
249	Cable	0502 0405
250	Power interface filter	0501 0660c
251	Cable	0502 0417
252	Cable	0502 0404
253	Cable	0502 0402
254		
255	Control panel comp.	0502 0500
256	Board front plate	0502 0505
257	Cable	0502 0405
258	Joint with emergency-stop coml.	0502 0520
259	Guide form	0502 0502
260		
261		
262		
263		
264		
265	Eprom column	0502 0480
266	Eprom tube	0502 0480
267	Eprom Bucky	0502 0480
268	Eprom control panel	0502 0485

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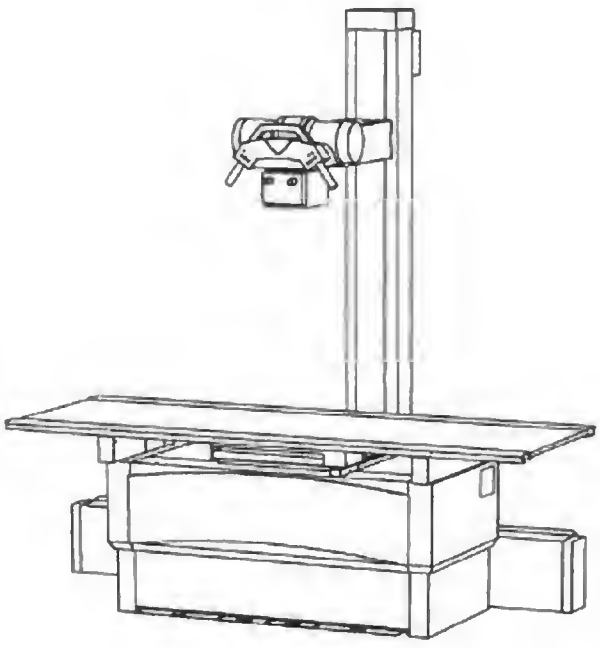
4.5 Maintenance Documentation

Name Plate Location:



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4.6 Maintenance Certificate

The maintenance according to the attached maintenance instructions has been carried out. Any parts replaced were original spare parts as shown on the list.

Replaced parts (List item no. only)

Date Name of company Signature

Replaced parts (List item no. only)

Date Name of company Signature

Replaced parts (List item no. only)

Date Name of company Signature

Replaced parts (List item no. only)

Date Name of company Signature

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Notes:

Subject to technical alterations TV / Ru

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